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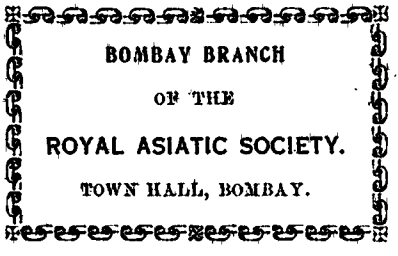

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ANNUAL REPORT

OF THE

PUBLIC HEALTH COMMISSIONER WITH THE GOVERNMENT OF INDIA

FOR 1933

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Volume I

With Appendices

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ANNUAL REPORT OF THE PUBLIC HEALTH COMMISSIONER WITH THE GOVERNMENT OF INDIA FOR 1933.

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Annual Report of the Public Health Commissioner with the Government of India for 1933.

VOLUME I.

SECTION I

ON THE STATE OF THE PUBLIC HEALTH IN BRITISH INDIA AND SOME INDIAN STATES.

Introduction.

1. The chief vital statistical facts relating to British India for 1933 are :—

1. Total births numbered 9,678,876 giving a crude birth rate of 35·5 *per mille* as compared with 33·7 in 1932.
2. Total deaths numbered 6,096,787 giving a crude death rate of 22·4 *per mille* as compared with 21·6 in 1932.
3. Infantile deaths numbered 1,650,973, or 27 per cent. of the total mortality, giving an infantile death rate per 1,000 births of 170·5 as compared with 168·7 in 1932.
4. The crude increase in population was 3,582,089 which gives a rate of 13·1 *per mille.*

In these four short paragraphs are summarised the main health statistics of India for 1933 and they may conveniently be made the text for the introductory paragraph of this annual review. In the first place it is clear that there has been no violent disturbance in the Indian vital statistical world. The birth rate, though somewhat higher than in the two previous years, has merely returned to the average level recorded during the 33 years of the present century and the slight reductions recorded during 1931 and 1932 seem to have been merely fortuitous in character and cannot be taken to indicate that there is any tendency for the Indian peoples to follow the example of western nations in respect of restriction of families. The death rate is slightly higher than that recorded in 1932 but does not show any great departure from the downward trend which has characterised the general death rate since the great influenza epidemic of 1918-19. Unfortunately, the same cannot be said of the infantile death rate. In the 1931 report attention was drawn to the downward trend in this rate following the disastrous years of 1918 and 1919 but the recorded rates of the past 6 years seem to indicate that that trend has disappeared. Since 1928, in fact, the annual figures for infant mortality have fluctuated only slightly between 181 per 1,000 births in 1930 and 169 in 1932 and the figure for 1933 again lies between these two contiguous limits. It seems that, for the present, the factors influencing infantile mortality are comparatively stable and that new and more vigorous preventive measures will have to be planned and put into execution before a further saving of infant life can be expected. No public health officer can look with any degree of equanimity on an annual death roll of nearly $1\frac{3}{4}$ million infants

below one year of age and if, as has been repeatedly stated, the infant mortality rates of a nation provide an accurate estimate of its sanitary conditions, then India has little cause for satisfaction as regards the state of its public health. The further deduction may be made that existing campaigns in the fields of child welfare and maternity relief have had so far little or no widespread influence, although no doubt in the restricted areas in which they are carried on a considerable effect may have been produced. As a matter of fact the small degree to which this form of preventive work has so far developed makes it evident that the merest fringe of the problem has been touched and it could not possibly have produced effects sufficiently profound to have influenced the infantile death rates common to the general population of rural India. In any case, these facts and figures indicate the enormous problems awaiting attack and make clear the extent of the health work facing the new provincial and central Governments which will shortly come into being under the reformed constitution.

The three main epidemic diseases, cholera, plague and smallpox, together caused 214,590 deaths but although this number is somewhat higher than in the previous year, owing to an increased prevalence of smallpox, the combined death rate was only 0·9 *per mille*. Cholera was for another year only a minor problem and, although it is dangerous to be optimistic, it seems unlikely that India will in the future suffer from the devastating pandemics which were a feature of the later years of the 19th century. Plague once more shows a reduced incidence and although the total deaths still numbered nearly 43,000, in this case also, the disease appears to be gradually dying out. Smallpox deaths increased in a disconcerting manner from 45,000 in 1932 to 103,000 in the year under review and the epidemic was fairly widespread over the whole of the Indian Peninsula. The present exacerbation after a series of years of comparative freedom from epidemic smallpox indicates how far India still has to go before this disease is satisfactorily controlled.

Of the 3½ million deaths registered as due to ' fevers ', probably a large proportion were actually caused by malaria. It is also a fair assumption that numbers of malaria deaths were recorded under " other causes ". Remembering also that 12½ million diagnosed cases of malaria attended at hospitals and dispensaries, it may be fairly estimated that during 1933 malaria exacted a toll of at least 1,000,000 lives. This terrible mortality is apt to be lost sight of owing to the defective and misleading nature of statistical records and because of the less dramatic nature of the disease as compared with cholera, plague and smallpox, except when a violent epidemic occurs such as that of 1908 in the Punjab. But year after year in India, malaria is probably responsible for about 20 per cent. of the total recorded deaths and many millions of the population experience periods of sickness which cause grave loss of earning power and much economic distress. The problems associated with the prevention of malaria in this vast sub-continent are such as might well daunt the most courageous, for the poverty of the people and the lack of resources among local boards and municipalities prohibit all expensive measures. During recent years a number of local Governments have made successful attempts in certain particularly malarious areas to provide the stricken populations with free supplies of quinine and, even although here also lack of funds has restricted effort, a considerable degree of betterment has been achieved. In a later section of this report an attempt has been made to estimate the amounts of quinine distributed through hospitals and dispensaries and by public health staffs in the different provinces and a

brief examination of the figures will show how ludicrously inadequate these quantities are. At the same time, under present circumstances, probably more benefit can be conferred by the distribution of quinine than by other anti-malarial measures and it is to be hoped that the Government of India will be able to accept the suggestion that its reserve stocks of quinine should be gifted to the provinces in order that, even temporarily, more adequate supplies of the drug may reach the people. It is an unfortunate fact that India cannot herself produce anything like the amount of quinine her population requires and that present prices make it largely a prohibitive luxury to most of her people. Nevertheless it is urgently important that larger quantities should be made available, for it is difficult to suggest other means of succour to the millions who suffer from this deadly disease.

At the risk of being accused of vain reiteration, it seems once more necessary to invite attention to the increasing gravity of the problems associated with the continued growth of the population which still proceeds apace. During 1933, the population of British India increased by over 3½ millions, and the estimated population at the mid-year period was nearly 273 millions. There is no reason to think that in the Indian States the same increase has not occurred, for these States are in such intimate relationship with different parts of British India, that any factor tending to reduce numbers in one would exert a similar force in the other. This means that since the end of February 1931, nearly 18 millions have been added to the population of India and on a conservative estimate, the total must now be approximately 370 millions. This estimate is almost certainly conservative because, for the purposes of these calculations, the rate of increase has been taken as that recorded during the decade 1921—31. This rate has however been considerably exceeded each year since the census of 1931 so that it would not be unduly stressing the case to add another 2 millions to the grand total. Even with this omission, however, the problem is large enough and if existing conditions continue—and at the moment of writing no indication of change is evident—there seems little doubt that by 1941, when the next census is taken, the population of India will considerably exceed the estimate of 400 millions given in last year's report. The population problem in India is therefore a real one and because scepticism still exists in the minds of certain authorities who continue to ignore facts, that problem demands further examination from an angle which, so far as I am aware, has not yet been given sufficient attention. Table I (*v*) gives official figures for 1933-34 for the total acreages of cultivated and uncultivated land in British India and in the individual provinces and Table I (*vi*) gives the corresponding acreages under food crops for the same year. The late Mr. Joseph Chamberlain at one stage of his political career, spoke of "three acres and a cow" as providing a sufficient standard of living for the average English agricultural labourer and this famous phrase has been frequently used since as forming a suitable basis on which to found arguments intended to defeat *laisser faire* opposition. Examination of the figures in the two tables mentioned above gives interesting results. The total land in British India amounts to 667 million acres but of this total only 232 million acres were cultivated and sown, 47 millions lying fallow, 154 millions being culturable but uncultivated, 145 millions being not available and 89 million acres consisting of forests. Even making the ridiculous assumption that the whole 667 million acres of land were available, this works out at only 2·44 acres per head of the population. A more reasonable assumption would be to take the acreage made up ofcultivated and sown, fallow, and culturable

but uncultivated. These three items total 481 million acres which gives only 1·75 acres per head of the population. But some land must be allowed to lie fallow, an additional proportion must be given over to the cultivation of crops other than food and Table I (*vi*) shows that during 1933-34 the total acreage under food crops amounted to only 206½ million acres. This gives only 0·72 acres per head of the population in British India and it does not require more than an elementary knowledge of agriculture to realise that it is impossible to provide a sufficiency of food for the present population of India from an acreage of this dimension. It may even be held that, were all available cultivable land given over to food production alone, the supply would fall short of reasonable and adequate demand. In order to forestall the usual argument, it can be admitted that the present shortage *might* be met for a short period of years by more intensive methods of cultivation, but that implies the immediate adoption of these intensive methods all over India and to those of us who know the village *ryot*, it is difficult to envisage a solution of the problem along those lines. Even supposing that additional food supplies were made available in this way, however, the difficulties would only be postponed for a few years, because the increased numbers of the population would rapidly absorb the surplus. Apparently, therefore, the problem of numbers in India is even more acute than before and it is one of such importance to the welfare of this country that it deserves immediate examination and certainly more detailed notice than it receives in paragraphs of this report. Numbers are so intimately bound up with economics that the problem is one which affects every department of Government and every class of citizen. It is a question which will shortly force itself upon the attention of every man and woman in this country: it is to be hoped that it will receive adequate notice before disaster befalls.

In the chart facing this page and in Table I (*i*) the rates for British India are compared with the corresponding figures in a number of other countries.

TABLE I (*i*).

	Birth rate per mille.	Death rate per mille.	Natural increase per mille.	Infantile death rate per 1,000 births.
British India	**35·5**	**22·4**	**13·1**	**171**
England and Wales	14·4	12·3	2·1	64
Scotland	17·6	13·2	4·4	81
Australia	16·8	8·9	7·9	39
New Zealand	16·6	8·0	8·6	32
Canada	20·9	9·6	11·3	73
Union of South Africa	23·7	9·3	14·4	60
Federated Malay States	35·5	20·2	15·3	137
Palestine	44·0	20·0	24·0	144
United States of America	17·4	10·6	6·8	58
Japan	31·6	17·8	13·8	118
Egypt	42·9	28·8	14·1	175

No. I

A COMPARISON OF BIRTH, DEATH AND INFANTILE MORTALITY RATES OF INDIA WITH OTHER COUNTRIES IN 1933.

Population.

2. Tables I (*ii*) and I (*iii*) give mid-year estimated populations for British India and the provinces and by sex and age. The figures must be taken as only approximately accurate; the effect of migration has not been taken into account whilst defective registration introduces another factor impossible to estimate.

TABLE I (*ii*).

Estimated population, 1933.

	Estimated population, 30th June 1932.	Excess of births over deaths.	Estimated population, 30th June 1933.	Percentage increases. March 1931 to June 1932.	July 1932 to June 1933.	Total.
British India	**263,896,023**	**3,717,807**	**272,613,830**	**1·2**	**1·4**	**2·6**
N.-W. F. P.	2,391,464	20,942	2,412,406	1·4	0·9	2·3
Punjab	23,945,029	407,664	24,352,693	2·1	1·7	3·8
Delhi	649,099	11,139	660,238	2·0	1·8	3·8
U. P.	48,864,400	800,937	49,665,337	0·9	1·7	2·6
B. & O.	38,039,905	587,590	38,627,495	1·0	1·5	2·5
Bengal	50,243,355	359,487	50,602,842	0·7	0·7	1·4
C. P.	15,710,027	298,061	16,008,088	1·3	1·9	3·2
Bombay	22,156,229	274,336	22,430,565	1·6	1·3	2·9
Madras	45,893,699	706,150	46,599,849	1·6	1·6	3·2
Coorg	163,662	471	164,133	0·2	0·3	0·5
Assam	8,023,088	96,846	8,119,934	1·2	1·2	2·4
Burma	12,252,637	149,057	12,401,694	1·2	1·2	2·4
Ajmer-Merwara	563,429	5,127	568,556	0·6	0·9	1·5

TABLE I (*iii*).

Estimated population by sex and age.

	Males.	Females.	Total.
All ages	140,436,399	132,177,431	272,613,830
0— 5 years	20,093,012	20,396,420	40,489,432
5—10 „	18,406,490	16,666,342	35,072,832
10—15 „	16,901,387	14,828,918	31,730,305
15—20 „	12,801,559	12,712,728	25,514,287
20—30 „	24,433,155	24,297,093	48,730,248
30—40 „	20,123,689	17,932,234	38,055,923
40—50 „	13,828,054	12,085,897	25,913,951
50—60 „	8,261,026	7,670,653	15,931,679
60 years and upwards	5,588,027	5,587,146	11,175,173

Emigration and immigration.—The cessation of the flow of emigrants from Madras to Malaya which began in 1931 continued in 1933, the total number during the year being only 38 ; those emigrating to Ceylon decreased to 32,898. Immigrants from the same colonies numbered 51,775, exclusive of those who returned at their own expense. Immigrants to Burma by sea numbered 243,365 and emigrants from the same province totalled 252,203. Of the 203,307 emigrants who sailed from Rangoon, 194,925 were bound for India. In addition, large numbers of agricultural labourers went to Arakan from Bengal by the overland route. Those immigrating to Assam numbered 41,037.

During 1933, therefore, migration resulted in some considerable addition to the population of India.

Rainfall and other weather Conditions.

3. Through the courtesy of the Director General of Observatories some of the important features regarding rainfall and weather conditions are given below :

Taking the year as a whole, rainfall was within 20 % of the normal in the Bay Islands, Burma, Assam, Bengal, Chota Nagpur, Bihar, the east United Provinces, Kashmir, the N.-W. F. P., Baluchistan, east Central India, south-east Madras, the Madras Deccan and the north Madras coast and between 21 to 49% in excess over the rest of the country.

During January and February, rainfall was in moderate to large excess in Bengal, B. & O., the C. P. and Hyderabad and in moderate to large defect elsewhere. Over the plains of the country as a whole a 10 % defect was recorded.

During March to May, rainfall was in slight defect in Assam, normal in Bengal, the N.-W. F. P. and Sind, in slight to moderate excess in Burma, B. & O., and the Punjab and in large excess elsewhere. Averaged over the plains of India, there was an excess of 40 %.

No prolonged breaks occurred during the monsoon season, June to September, and rainfall was on the whole well distributed over the country. It was normal in Burma, Assam and the U. P., in slight excess in Bengal, B. & O., the Bombay Presidency, Central India, the C. P., Hyderabad, Mysore and the Madras Presidency ; in moderate excess in Rajputana ; and in large excess in the Punjab, the N.-W. F. P. and Sind. Over the plains of the country as a whole, an excess of 14 % was registered.

During the retreating south-west monsoon period, October to December, rainfall was in moderate to large defect in the Punjab, the N.-W. F. P. and Sind and in slight defect in Burma, Assam and Bengal ; it was normal in B. & O., and the Madras Presidency ; in slight to moderate excess in Rajputana, the Bombay Presidency, Central India, the C. P., and Mysore ; and in large excess in the U. P. and Hyderabad. Averaged over the plains of India, the season's rainfall was in excess by 4 %.

Abbreviations—

N.-W. F. P.	North-West Frontier Province.	P. M.	Per mille.
U. P.	United Provinces of Agra and Oudh.	R.	Rural.
B. & O.	Bihar and Orissa.	U.	Urban.
C. P.	Central Provinces and Berar.	M.	Male.
D.P.H.	Director of Public Health.	F.	Female.

Table I (*iv*) gives details :—

TABLE I (*iv*).

Rainfall in inches.

	January and February.		March to May.		June to September.		October to December.		Total.	Departure from normal.
	Actual.	Normal.	Actual.	Normal.	Actual.	Normal.	Actual.	Normal.		
Mean of India .	**0·9**	**1·0**	**7·0**	**5·0**	**41·7**	**36·6**	**5·2**	**5·0**	**54·8**	**+7·1**
N. W. F. P. .	1·6	2·5	4·1	4·2	12·1	7·8	0·2	1·1	18·0	+2·5
Punjab . .	0·9	1·9	2·6	1·9	24·8	15·3	0·4	0·8	28·7	+8·7
U. P. . .	1·1	1·5	2·9	1·4	33·9	33·5	3·6	1·8	41·5	+3·3
B. & O. . .	2·9	1·4	6·0	4·0	47·5	42·5	3·9	3·7	60·3	+9·0
Bengal . .	1·7	1·3	13·1	12·6	62·1	54·7	4·6	6·0	81·5	+6·7
C. P. . .	2·3	1·3	4·5	1·6	49·5	39·9	3·1	2·7	59·4	+13·4
Bombay . .	0·1	0·2	3·9	1·6	48·7	39·6	5·2	3·5	57·9	+13·1
Madras . .	0·3	1·2	12·8	6·0	34·2	28·9	16·6	15·8	63·9	+12·0
Assam . .	1·6	2·2	19·6	25·0	64·1	66·8	5·3	7·0	90·6	—10·0
Burma . .	0·1	0·3	13·0	10·5	61·3	62·3	7·2	9·2	81·6	—0·7
Sind . .	0·1	0·5	0·5	0·5	8·9	5·5	..	0·2	9·5	+2·8
Rajputana .	0·3	0·6	1·9	0·9	27·8	19·2	0·9	0·7	70·9	+9·5
Central India .	0·4	0·9	2·1	0·9	39·5	33·4	1·7	1·5	43·7	+7·1
Hyderabad .	0·9	0·4	4·1	1·9	31·7	26·4	6·8	3·8	43·5	+10·9
Mysore . .	0·1	0·3	9·0	5·3	27·7	22·4	12·0	8·2	48·8	+12·6

Agricultural and Economic Conditions, 1933-34.

4. Table I (*v*) gives the cultivated and uncultivated acreage in British India and different provinces during the years 1932-33 and 1933-34.

TABLE I (*v*).

Area cultivated and uncultivated in each province.

		Cultivated.		Uncultivated.		Forests.
		Net area actually sown.	Current fallows.	Culturable waste other than fallow.	Not available for cultivation.	
British India	1933-34	**232,106,157**	**47,452,937**	**153,588,655**	**144,650,401**	**89,066,930**
	1932-33	228,075,963	50,502,189	154,436,818	145,208,565	88,802,903
N.-W. F. P. .	1933-34	**2,290,767**	**532,900**	**2,706,826**	**2,690,925**	**355,460**
	1932-33	2,352,342	512,178	2,669,592	2,689,359	353,349
Punjab .	1933-34	**28,682,946**	**2,450,469**	**14,203,373**	**12,862,158**	**1,972,819**
	1932-33	26,255,667	4,643,799	14,532,863	12,775,546	1,978,663
Delhi .	1933-34	**213,054**	**14,454**	**61,121**	**80,027**	..
	1932-33	219,529	6,988	62,447	80,891	..
U. P. .	1933-34	**36,010,072**	**2,494,740**	**10,279,727**	**9,901,333**	**9,281,176**
	1932-33	35,673,544	2,669,127	10,474,351	9,878,915	9,278,922

		Cultivated.		Uncultivated.		
		Net area actually sown.	Current fallows.	Culturable waste other than fallow.	Not available for cultivation.	Forests.
B. & O.	1933-34	24,179,900	6,930,987	6,951,121	8,014,594	7,056,531
	1932-33	24,059,800	6,887,475	7,025,753	8,103,574	7,056,531
Bengal	1933-34	24,002,400	4,763,330	6,255,188	8,920,219	4,607,440
	1932-33	23,349,200	5,223,115	6,234,766	9,114,184	4,627,312
C. P.	1933-34	24,988,652	3,773,525	14,107,740	4,946,445	16,272,020
	1932-33	24,556,317	4,134,759	14,177,928	4,942,549	16,273,898
Bombay	1933-34	33,245,929	10,263,999	6,584,789	19,522,658	9,260,932
	1932-33	33,008,149	10,247,075	6,815,125	19,725,420	9,086,812
Madras	1933-34	33,879,523	10,375,409	13,180,616	19,878,901	13,693,112
	1932-33	34,186,205	10,115,311	13,138,696	20,063,367	13,640,272
Coorg	1933-34	137,560	171,780	11,690	334,045	364,445
	1932-33	138,414	170,926	11,690	334,045	364,445
Assam	1933-34	5,886,626	1,869,163	19,210,307	4,571,030	3,947,674
	1932-33	5,958,367	1,917,838	19,163,096	4,571,030	3,874,469
Burma.	1933-34	18,239,159	3,651,288	59,755,221	52,045,325	22,158,539
	1932-33	18,006,054	3,789,726	59,827,310	52,054,994	22,171,448
Ajmer-Merwara.	1933-34	349,569	160,893	280,936	882,741	96,782
	1932-33	312,375	183,872	303,201	874,691	96,782

Table I (*vi*) gives the areas under food crops in 1933-34 in the major provinces. Figures for minor administrations are not available.

TABLE I (*vi*).

	Acres.
N.-W. F. P.	2,275,566
Punjab	24,961,924
U. P.	38,051,685
B. & O.	24,441,000
Bengal.	23,180,100
C. P.	20,439,598
Bombay	24,885,000
Madras	29,754,422
Assam	4,973,225
Burma	13,682,958
Total	206,645,478

Additional information extracted from provincial season and crop reports is included in the following sub-paragraphs.

N.-W. F. P.—The total area harvested amounted to 1,966,729 acres which was 6% below normal. The *kharif* area cropped, aggregating 797,381 acres, was 14 % more than that in 1932-33 and the *kharif* harvest was about 5 % above normal. Of the sown *rabi* area 72 % matured as against 78 % in 1932-33. Irrigated crops aggregated 967,359 acres or 36 % of the total sown area. The area under rice amounted to 38,900 acres ; that under *jowar* 85,940 acres ; *bajra* 190,622 ; maize 465,384 ; sugarcane 43,702 ; cotton 200,890 ; wheat, the most important crop of the province, 1,041,186 ; barley 134,669 ; gram 222,606 and rapeseed 111,745 acres. The estimated produce of rice was 15,927 tons ; of *jowars* 10,778 tons ; maize 188,841 ; sugarcane 54,368 ; cotton 2,805 ; wheat 239,408 ; barley 40,122 ; gram 20,294 ; and rapeseed 8,649 tons.

Compared with the normal, prices continued low. Fodder and stocks of food grains were generally sufficient. The economic condition of the agricultural population continued to be unsatisfactory owing to the continued depression in trade and fall in prices. Malaria and sporadic cases of smallpox were reported in the districts of Kohat and Bannu and in North Waziristan and Kurram Agencies. Foot and mouth disease and haemorrhagic septicaemia prevailed in a mild form in some parts of Bannu district.

Punjab.—Owing to favourable climatic conditions during the sowing season, the total sown and matured areas increased in 1933-34 to 34,494,005 acres and 28,569,714 acres or 83 % of the sown area. These were in excess of the decennial averages of 30,695,241 acres and 25,306,024 acres respectively by 12 % and 13 %. The remaining 5,924,291 acres, or 17 % of the total, failed to mature as against a decennial average of 5,389,217 acres. The *kharif* sown area increased by 400,838 acres and the *rabi* sown area by 4,035,905 acres. Of the 10,911,031 acres available for canal irrigation, 10,216,270 acres were actually cultivated. The totals for the principal crops were :—

TABLE I (*vii*).

	Area (Acres).	Tons.	Variation from normal %.
Wheat	9,772,860	2,793,700	—6
Rice	1,034,786	526,900	+22
Maize	1,056,030	287,600	—22
Gram	6,586,430	1,385,400	+32
Barley	708,610	147,800	—41
Jowar	875,472	76,900	—27
Bajra	8,356,021	376,600	+7
Rabi Oilseeds	1,099,127	131,000	—19
Sugarcane	558,152	364,300	+8
Tobacco	48,551	20,300	..
Cotton	2,449,402	927,100	bales +50

NOTE.—The facts and figures given in this section have been taken from the Agricultural Department Publications and Communiques on season and crop reports.

Rabi crops are those sown after the rains and reaped in the first 3 or 4 months of the ensuing year, *i.e.*, in the spring (March-April); the *Kharif* crops are those sown before the commencement of the rains (April-May) and reaped after their close (October-November); the *Bhadoi* and *Aghani* crops are also autumnal, the former being harvested in August-September and the latter in November-December.

The prices of all the important crops except raw sugar, *toria* and tobacco were lower than in 1932-33 and stocks of food grains and supplies of fodder were generally sufficient. The condition of agricultural stock was generally good and except in 2 districts outbreaks of cattle diseases were mild ; some loss of cattle due to heavy floods was reported in the districts of Rohtak and Karnal. Agricultural deterioration due to hill torrents was reported in parts of Ambala and Jhelum districts ; whilst in the districts of Jullundur and Hoshiarpur, the fall in water levels was continued. *Sem* and *thur* were still the causes of deterioration of land in some districts.

Public health conditions were generally good and epidemic disease did not interfere with agricultural operations to any appreciable extent. Owing to low prices and the general trade depression, economic conditions remained unchanged.

U. P.—The total rainfall was above the normal in the Meerut, Kumaun, Agra, Rohilkhand and Gorakhpur divisions ; elsewhere it was in defect.

The net cropped area aggregated 35,381,277 acres, excluding 7,841,529 acres cropped more than once, this figure representing a small increase as compared with 1932-33 and the normal.

Owing to excessive or deficient rains in certain areas the total *kharif* area diminished by 41,505 acres. The *rabi* area exceeded the figure for 1932-33 by 5% and the mean by 6·5 %.

Of a total of 43,222,806 acres cultivated, 38,051,685 acres were under food and 5,171,121 acres under non-food crops ; of these totals, 9,020,445 acres and 1,862,887 acres respectively were under irrigation. The important crops by average are given in Table I (*viii*).

TABLE I (*viii*).

	Food crops.			Non-food crops.	
	1933-34.	Normal.		1933-34.	Normal.
Total	38,051,685	37,617,000	Total	5,171,121	5,028,000
Wheat	8,452,609	6,862,000	Linseed	212,730	348,000
Rice	5,979,608	6,747,000	Til	437,878	293,000
Barley	4,271,941	4,452,000	Rapeseed	219,428	161,000
Juar	2,631,740	2,349,000	Other oilseeds	76,821	52,000
Bajra	2,141,148	2,327,000	Sugarcane	1,713,183	1,321,000
Kodon	1,203,613	1,260,000	Cotton	805,219	1,075,000
Maize	2,023,052	2,124,000	Hemp	159,350	157,000
Gram	5,299,697	5,360,000	Indigo	1,664	54,000
Sawan	518,220	581,000	Opium	15,952	213,000
Mandua	70,656	147,000	Tobacco	80,741	79,000
Potato	150,752	106,000	Fodder crops	1,313,544	1,141,000
Others	5,308,649	5,302,000	Others	134,611	134,000

The yield of early and late rice was 70 % and 75 % respectively of the normal ; cotton 60 % ; sugarcane 80 % ; *juar* 70 % ; *bajra* 72 % ; maize 70 % ; indigo 55 % ; *til* 76 % ; wheat 70 % ; gram 70 % ; linseed 66 % ; rapeseed 58 % ; and barley 80 per cent.

Compared with 1932-33, food grains were much cheaper. The condition of agricultural stock was on the whole satisfactory, although outbreaks of epidemic disease were reported in several districts.

B. & O.—The harvested area further diminished to 29,165,300 acres, this total including 7,679,200 under *bhadoi*, 10,498,400 under *aghani*, 10,408,600 under *rabi* and 579,100 under fruits, vegetables, etc. The *bhadoi* crop was estimated at 89 % of the decennial average; those of maize and autumn rice at 448,900 and 956,200 tons, respectively ; those of jute and winter rice at 448,200 bales and 66,437,400 cwts. and of *gur* at 12,458,000 cwts.

The *rabi* crops totalled 475,900 tons of wheat or 89 % of the decennial average, spring oilseeds 271,800 tons or 89 %, castor 9,000 tons or 102 % and summer rice, gram, barley, etc., 3,259,700 tons or 84 %. The condition of the cotton crop was fair to good, but the estimated outturn dropped to 8,083 bales or by 38 % as compared with 1932-33. Gross outturns of the *bhadoi*, *aghani* and *rabi* harvests were estimated at 89 %, 92 %, and 85 % of the average.

Prices of food grains ruled lower ; whilst with few exceptions stocks were generally sufficient. Mild outbreaks of contagious diseases were reported in different parts of the province ; rinderpest, haemorrhagic septicaemia and foot and mouth disease prevailed all over North Behar and black quarter in the districts of Champaran, Muzaffarpur and Darbhanga.

The economic condition of the people was on the whole satisfactory, although the fall in prices and trade depression had adverse effects. The demand for labour was less and there was continued emigration from Balasore, Puri and Ranchi to Calcutta, Jamshedpur and Rangoon.

Bengal.—The season was generally satisfactory for the winter and autumn crops and fair for *rabi* crops. The cropped area totalled 28,575,900 acres as compared with a normal of 31,177,700. The area under food grains amounted to 23,180,100 acres, as against a normal of 24,940,100 acres, of which rice totalled 21,672,500 acres. Sugar crops were again in excess of the normal, the figure being 310,200 acres. Cropped areas for tea, tobacco, cinchona, Indian hemp, etc., also exceeded their normal. The outturn of the *bhadoi* crops was estimated at 79 % of the normal ; jute 7,045,600 bales of 400 lbs. ; winter rice 81 % of the normal ; sugarcane 86 % ; *rabi* crops 78 % ; and cotton 23,802 bales.

Prices improved slightly although in the case of jute no marked improvement was recorded. Agricultural wages ruled much the same as in the previous year. There was no serious outbreak of epidemic disease.

C. P.—The cultivated area included irrigated 1,114,280 acres and non-irrigated 26,640,755 acres ; 18,940,767 acres under *kharif* and 8,814,268 acres under *rabi* harvests. Rice occupied 5,637,073 acres ; *juar* and *tur* 4,443,703 ; *bajra* 101,452 ; *kodon* and *kutki* 1,639,754 ; *til* 569,758 ; cotton 4,413,430 ; wheat 2,828,663 ; sugarcane 28,806 acres ; gram 946,730 ; linseed 884,067 and drugs and narcotics 481,783. The yield of the different *kharif* crops was estimated at 1,656,900 tons of rice ; 1,025,100 of *juar* ; 89,700 of *tur* ; 176,200 of *kodon kutki* ; 43,100 of *til* ; 732,700 bales of cotton ; 48,310 tons of *gur* ; 715,200 of wheat ; 202,300 of gram ; and 90,400 of linseed. The standard outturn in lbs. per acre of these crops is given in the statement below.

According to these, a total outturn of 3,911,500 tons of rice, *Juar*, wheat, gram, *tur*, *kodon kutki* and *masur* was estimated.

	Standard outturn.		Standard outturn.
Rice	648	Kodon kutki	520
Juar	646	Wheat	548
Cotton	102	Gram	534
Tur	400	Linseed	215
Til	210		

The wholesale price of cotton at harvest time rose on an average by 10 % whilst that of linseed was higher by 22% ; those of rice, *juar*, wheat and *til* fell by 6 %, 15 %, 16 % and 15 %, respectively, and that of gram remained steady. The condition of the agricultural population continued to be generally poor although in the rice areas they were not badly affected.

Bombay Presidency (1932-33).—In spite of the uneven distribution of the rains, the season was generally satisfactory. The opening of the Lloyd Barrage Canal system in Sind was a special feature and both the area and outturn of the crops in this part of the province were considerably greater than in 1931-32 and the decennial mean.

In the Presidency proper, the cultivated area aggregated 29,155,000 acres and included 20,211,000 acres under food crops and 8,944,000 under other crops. Details of the more important food crops are given in Table I (*ix*).

TABLE I (*ix*).

	Cultivated (Acres).	Outturn (tons).
Jowari	7,599,000	1,590,335
Bajri	4,012,000	495,334
Rice	2,027,000	907,204
Wheat	1,658,000	323,192
Gram	672,000	129,200

Of the non-food crops, oilseeds 1,836,000 acres and cotton 3,830,000 acres, were the most important. The outturn of cotton, which amounted to 1,519,000 bales or 16·8 % more than in the previous year, varied from 75 % to 90 % of the normal in Gujarat and Khandesh. In other districts it was between 50 % and 70 % of the normal.

In Sind, of the 5,206,000 acres of land cultivated, 4,449,000 were occupied by food and 757,000 by non-food crops ; the more important of these were *bajri* 1,101,000 acres ; rice 1,108,000 ; wheat 969,000 ; *jowari* 612,000 ; gram 309,000 ; cotton 343,000 ; and oilseeds 264,000. The total outturn of rice amounted to 447,558 tons, wheat 279,300 tons, *jowari* 139,624, *bajri* 128,711 and gram 56,419 tons. The area under food crops in Sind was 20·7 % larger than that for 1931-32 and the yield of food crops rose by 22 % ; in the Presidency proper the cultivated area and the outturn decreased by 1·8 % and 0·3 %, respectively. Prices of food grains showed improvement. tocks of food and fodder were sufficient.

Madras Presidency.—The season was fairly satisfactory. Of the total area available for cultivation, only 33,879,523 acres, or 37 % were cultivated, excluding the areas cropped more than once. Irrigated land totalled 9,202,221 acres or 27 % of the total. The area under crops

decreased to 38,930,415 acres ; the decrease in the food crop area, which occupied 76% of the total area sown, amounted to 631,081 acres, whilst the non-food crops increased by 397,887 acres.

Table I (*x*) gives details of the important crops :—

TABLE I (*x*).

	Area cultivated (acres).	Outturn (tons).
Paddy	15,017,137	7,932,010
Cholam	8,424,951	1,283,270
Cumbu	4,820,802	691,070
Ragi	3,309,052	1,001,410
Korra	1,623,045	267,220
Varagu	1,134,761	414,570
Samai	736,686	145,750
Maize	107,590	46,870
Gram	2,778,885	167,470
Cotton	2,155,942	449,490 bales.
Oilseeds	5,648,211	Not available.

Stocks of food grains were generally sufficient. Wholesale prices of cotton, pepper and ginger were generally higher ; those of groundnuts, paddy, jiggery and castor were lower. Agricultural labour paid in kind has been little affected by the general economic depression ; that paid in cash improved appreciably.

Mortality among cattle from contagious disease was heavy in certain districts. Rinderpest accounted for 16% of the total deaths ; black quarter for 24% ; anthrax, haemorrhagic septicæmia and foot-and-mouth disease for 11%, 24% and 5%.

Assam.—A total of 6,575,926 acres of land were cultivated, including 4,973,225 acres under cereals and pulses, 357,642 acres under oilseeds, 35,485 acres under sugar, 193,465 acres under fibres, 444,366 under drugs and narcotics, 413,343 under fruits and vegetables and 158,400 acres under other crops. Rice, the most important food crop, occupied 4,721,973 acres of land ; rape and mustard 329,614 acres ; jute 156,603 ; and tea 430,375. The rice harvests totalled 1,394,900 tons, or winter rice giving 1,101,500 tons or 71% of the normal. The jute crop amounted to 446,800 bales, whilst tea crops totalled 98,100 tons or 90% of the normal. Wholesale prices of rice, mustard seed and *gur* were lower than normal. Judging from these figures, the economic condition of the agriculturists was fairly satisfactory.

Burma.—The gross harvested area totalled 18,232,854 acres or nearly 190,000 acres more than in 1932-33. That under rice amounted to 12,242,228 acres, millet 569,318 acres, maize 190,402 acres, gram 165,226, *pegyi* 136,466 acres, *sesamum* 1,609,408 acres, groundnut 640,188 acres and cotton 429,524 acres. The rice harvests aggregated 7,426,781 tons as compared with a normal of 6,989,100 tons. The total yield of *sesamum* was 67,000 tons of seed, of cotton 17,500 tons and of groundnut 190,000 tons.

Paddy prices further declined and those of other agricultural produce also ruled easier. The improvement in the prices of rubber, tin and wolfram relieved unemployment in rubber and mining areas. The condition of the cultivators in the dry zone districts compared favourably with that in Lower Burma and in the irrigated areas.

Famine conditions and their relief.

5. Test relief works were carried out in Hissar district in the Punjab; in the districts of Prome, Yamethin, Thayatmyo, Meiktila and Magwe in Burma; and in Murshidabad and 24-Parganas in Bengal.

High floods in the Mahanadi and Katjuri rivers in the beginning of August 1933 caused serious damage in the Cuttack and Puri districts of Orissa. Fortunately the loss of human life and cattle was not great; 7 people are known to have been drowned and 171 cattle were lost. In comparison, the flood was remarkable for the large number of houses damaged, 5,600 being completely destroyed and 11,600 seriously damaged. The measures of relief adopted by the local Government were supplemented by a grant of Rs. 40,000 from the Indian People's Famine Trust. The Trust also made contributions of Rs. 50,000 and Rs. 40,000, respectively, towards the relief of distress caused by floods in the Ambala Division of the Punjab and in the Delhi Province. In the four districts of the Ambala Division more than 10,000 cattle were lost, nearly 132,000 houses were destroyed and crops on over 580,000 acres were destroyed. In addition to making liberal distribution of *taccavi* for seed, amounting to Rs. 8,95,000, the Punjab Government distributed Rs. 60,000 from the Provincial Famine Relief Fund. Special remissions of land revenue and *abiana* amounting to Rs. 21½ lakhs were also made in this area. Similar generous measures of relief were also adopted by the Delhi Administration.

The Indian People's Famine Trust made a contribution of Rs. 8 lakhs towards relief of the widespread distress caused by the 1934 earthquake in Bihar.

Live-births.

6. *British India.*—Live-births registered during 1933 numbered 9,678,876 or 624,370 more than the figure for 1932. Compared with 1932, the U. P. recorded an increase of 220,462 births, Bengal 145,610, Madras 76,864, B. & O. 74,652 and Punjab 72,388; in Delhi, Ajmer-Merwara, N.-W. F. P., Assam and Bombay Presidency the excess varied between 670 and 10,816; whilst decreases were registered in the C. P. (—14,602) and Coorg (—260). Table I (*xi*) gives the registered numbers and rates *per mille* according to sex for British India and the various provinces. The highest birth rate was recorded in Delhi Province and the lowest in Coorg.

TABLE I (*xi*).

	Births.			Rate per *mille*.				Mean (1928-32).		
	M.	F.	Total.	M.	F.	Total.		M.	F.	Total.
						1933.	1932.			
British India .	**5,028,170**	**4,650,706**	**9,678,376**	**18·4**	**17·1**	**36**	**34**	**18**	**17**	**35**
N.-W. F. P. .	40,110	30,763	70,873	16	13	29	29	16	12	28
Punjab . .	549,975	492,649	1,042,624	23	20	43	41	21	19	40
Delhi . .	14,835	13,886	28,721	23	21	44	43	24	22	46
U. P. . .	1,006,021	892,513	1,898,534	20	18	38	34	19	17	36
B. & O. . .	690,914	656,034	1,346,948	18	17	35	33	17	16	33
Bengal . .	764,203	709,741	1,473,944	15	14	29	26	14	13	27
C. P. . . .	352,494	333,776	686,270	22	21	43	45	23	22	45
Bombay . .	412,227	381,506	793,733	18	17	35	35	19	18	37
Madras . .	872,879	831,366	1,704,245	19	18	37	35	19	18	37
Coorg. . .	2,090	1,972	4,062	13	12	25	26	12	11	23
Assam . .	126,882	119,236	246,118	15	15	30	30	14	14	28
Burma . .	183,942	177,012	360,958	15	14	29	27	14	13	7
Ajmer-Merwara .	11,594	10,252	21,846	20	18	38	35	..	..	..

Table I (*xii*) gives the total births and the relative rural and urban rates for British India and for each province. Judging from these figures the fecundity of the rural populations in the Punjab, Delhi, B. and O., Bengal, Madras and Bombay is greater than that of the town dwellers; in other provinces it is lower.

TABLE I (*xii*).

	Births.		Rate p.m.	
	Rural.	Urban.	Rural.	Urban.
British India	**8,827,138**	**851,738**	**36**	**32**
N.-W. F. P.	61,293	9,580	29	30
Punjab	926,116	116,508	44	36
Delhi	10,067	18,654	49	41
U. P.	1,715,762	182,772	37	48
B. & O.	1,313,826	33,122	35	23
Bengal	1,398,990	74,954	30	21
C. P.	609,682	76,588	43	45
Bombay	653,771	139,962	36	33
Madras	1,563,123	141,122	39	23
Coorg	3,713	349	24	36
Assam	240,073	6,045	30	30
Burma	315,746	45,212	29	32
Ajmer-Merwara	14,976	6,870	38	38

Birth rates for the chief communities are available for 7 provinces only and are given in Table I (*xiii*).

TABLE I (*xiii*).

	Hindus.	Muhammedans.	Christians.	Other classes.
N.-W. F. P.	29	30	20	14
Delhi	43	44	18	..
U. P.	39	40	10	25
B. & O.	36	33	26	36
Bengal	30	29	20	81
Madras	38	39	32	38
Coorg	25	18	32	..
Burma	16	28	23	31
Ajmer-Merwara	40	41	9	21

Birth rates have again been calculated on the estimated female population of the child-bearing groups, 15—40 years. This figure is 176 p. m. for

British India as against 166 in 1932. Table I (*xiv*) gives details for each province.

TABLE I (*xiv*).

	Female population, 15-40 years.	Total births.	Rate p.m.
British India	**54,934,638**	**9,678,876**	**176**
N.-W. F. P.	462,282	70,873	153
Punjab	4,302,676	1,042,624	242
Delhi	123,415	28,721	232
U. P.	9,743,459	1,898,534	195
B. & O.	7,980,776	1,346,948	169
Bengal	10,488,910	1,473,944	141
C. P.	3,272,893	686,270	210
Bombay	4,470,855	793,733	178
Madras	9,871,199	1,704,245	173
Coorg	33,277	4,062	123
Assam	1,567,967	246,118	157
Burma	2,506,386	360,958	144
Ajmer-Merwara	110,543	21,846	198

For purposes of comparison, the birth rates in British India and those of a number of other countries are given in Table I (*xv*). The only countries having rates comparable with those of India are Roumania, Egypt and Japan.

TABLE I (*xv*).

	Quinquennial.		Annual.				
	1921-25.	1926-30.	1929.	1930.	1931.	1932.	1933.
British India	**33·4**	**35·7**	**35·5**	**36·0**	**34·3**	**33·7**	**35·5**
England and Wales	19·9	16·7	16·3	16·3	15·8	15·3	14·4
Scotland	23·0	19·9	19·2	19·5	19·0	18·6	17·6
Belgium	20·4	18·6	18·3	18·8	18·3	17·7	16·5
Czechoslovakia	27·1	23·2	22·4	22·7	21·5	21·0	19·2
Denmark	22·3	19·4	18·6	18·7	18·0	18·0	17·3
France	19·3	18·2	17·7	18·0	17·4	17·3	16·3
Germany	22·1	18·4	17·9	17·5	16·0	15·1	14·7
Hungary	29·4	26·0	25·1	25·4	23·7	23·4	21·6
Italy	29·7	26·8	25·6	26·7	24·9	23·8	23·5
Netherlands	25·7	23·2	22·8	23·1	22·0	22·0	20·8
Norway	22·2	18·0	17·3	17·0	16·3	16·3	14·9
Portugal	33·2	31·2	29·9	29·8	29·7	29·9	29·0
Roumania	37·9	35·2	34·1	35·0	33·3	35·9	32·0
Spain	29·8	28·5	28·1	28·2	27·4	28·1	27·6
Sweden	19·1	15·9	15·2	15·4	14·8	14·5	13·7
Switzerland	19·5	17·6	17·1	17·2	16·7	16·7	16·4
Canada	27·4	24·1	23·5	23·9	23·2	22·4	20·9
New Zealand	22·2	19·7	19·0	18·8	18·4	17·1	16·6
South Africa (white)	27·1	26·1	26·2	26·4	25·4	24·3	23·0
U. S. A.	22·5	19·7	18·9	18·9	17·8	17·4	..
Japan	34·6	33·5	32·7	32·4	32·2	32·9	31·0
Egypt	43·0	44·4	44·4	45·7	44·8	42·9	..

In the Punjab, the district birth rates varied between 56 p.m. and 34 p.m.; in the U. P., between 54 and 24; in B. and O., between 48 and 27; in Bengal, between 42 and 22; in C. P., between 50 and 35; in Bombay Presidency, between 49 and 15; in Madras Presidency, between 44 and 30; in Assam, between 37 and 20; and in Burma, between 42 and 16.

Natural increases accruing from excess of births over deaths for decennial periods from 1881 to 1930 and for individual years from 1926-33 are given in Table I (*xvi*). Only since 1881 has registration of births been carried out in all the provinces; previous to that year registration was confined to selected areas, such as municipal towns.

TABLE I (*xvi*).

	Annual number of births.	Birth rate p.m.	Annual number of deaths.	Death rate p.m.	Annual excess of births over deaths.
1871—1880	Not available.		3,540,202	20	..
1881—1890	4,565,687	24	5,058,578	26	492,891
1891—1900	7,174,694	34	6,662,417	31	512,277
1901—1910	8,591,136	38	7,657,513	34	933,623
1911—1920	8,810,018	37	8,142,364	34	667,654
1921—1930	8,345,364	35	6,347,063	26	1,995,301
1926	8,395,679	35	6,460,610	27	1,935,069
1927	8,516,706	35	6,009,729	25	2,506,977
1928	8,882,573	37	6,180,114	26	2,702,459
1929	8,565,341	36	6,267,391	26	2,297,950
1930	8,690,714	36	6,483,449	27	2,207,265
1931	9,135,890	35	6,615,099	25	2,520,791
1932	9,054,506	34	5,805,666	22	3,248,840
1933	**9,678,876**	**36**	**6,096,787**	**22**	**3,582,089**

Table I (*xvii*) gives births by quarters of the year; as usual, the largest number was recorded in the fourth and the lowest in the second.

TABLE I (*xvii*).

	1st Quarter.	2nd Quarter.	3rd Quarter.	4th Quarter.
British India	**2,371,950**	**2,127,227**	**2,449,722**	**2,729,977**
N.-W. F. P.	17,839	16,126	17,801	19,107
Punjab	250,345	195,441	283,910	312,928
Delhi	5,835	5,456	8,766	8,664
U. P.	422,062	376,368	540,436	559,668
B. & O.	346,332	316,844	330,256	353,516
Bengal	436,422	330,395	264,585	442,542
C. P.	158,334	148,942	183,866	195,128
Bombay	189,377	183,522	205,416	215,418
Madras	378,531	412,004	471,509	442,201
Coorg	1,013	1,190	1,014	845
Assam	71,674	48,953	47,722	77,769
Burma	89,128	87,609	88,169	96,053
Ajmer-Merwara	5,058	4,378	5,272	6,138

Table I (*xviii*) gives the proportion of male to female births for provinces and for British India as a whole.

TABLE I (*xviii*).

	Males born per 1,000 females.		
	1933.	1932.	1928-32.
British India	**108**	**108**	**108**
N.-W. F. P.	130	130	130
Punjab	112	112	112
Delhi	107	108	109
U. P.	113	112	112
B. & O.	105	105	104
Bengal	107	108	108
C. P.	106	105	105
Bombay	108	108	108
Madras	105	105	105
Coorg	106	109	107
Assam	106	106	107
Burma	104	104	105
Ajmer-Merwara	113	113	117

Births exceeded deaths by 993,646 in the U. P.; 635,322 in Madras Presidency; 513,551 in B. and O.; 382,082 in the Punjab; 276,059 in Bengal; 274,471 in the C. P. and Berar; 253,056 in Bombay Presidency; 134,507 in Burma; 85,064 in Assam; 20,670 in N.-W. F. P.; 7,653 in Delhi; 5,877 in Ajmer-Merwara and 131 in Coorg. The birth rate exceeded the death rate in every province, the largest differences being recorded in the U. P. (+20 p.m.); C. P. (+17); Punjab (+16); Madras Presidency (+14); B. and O. (+13); Bombay Presidency (+11); Burma (+11); Assam (+10); Ajmer-Merwara (+10); N.-W. F. P. (+8); Bengal (+5) and Coorg (+1).

Deaths.

7. *British India.*—Registered deaths numbered 6,096,787 as against 5,805,666 in 1932.

The death rate was 22·4 p.m. as against 21·6 p.m. in 1932. The rate for females exceeded that for males in the Punjab (+3 p.m.), Delhi (+10), Bengal (+1), Bombay Presidency (+1), and Coorg (+3). Table I (*xix*) gives registered numbers and the rates *per mille* according to sex for British India and the various provinces.

TABLE I (*xix*).

	Deaths.			Rate p.m.				Mean (1928-32).		
	M.	F.	Total.	M.	F.	Total. 1933.	Total. 1932.	M.	F.	Total.
British India	**3,158,375**	**2,938,414**	**6,096,787**	**22·5**	**22·2**	**22·4**	**21·6**	**25**	**25**	**25**
N.-W. F. P.	27,059	23,144	50,203	21	21	21	20	20	19	20
Punjab	343,398	317,144	660,542	26	29	27	24	24	25	25
Delhi	10,591	10,477	21,068	28	38	32	24	27	34	31
U. P.	483,996	420,892	904,888	19	18	18	22	25	25	25
B. & O.	430,908	402,489	833,397	22	21	22	20	25	23	24
Bengal	613,770	584,115	1,197,885	23	24	24	20	22	22	22
C. P.	218,418	193,381	411,799	27	24	26	27	35	32	34
Bombay	278,702	261,975	540,677	24	25	24	23	26	27	27
Madras	538,295	530,628	1,068,923	23	23	23	22	25	24	25
Coorg	2,048	1,883	3,931	23	26	24	23	24	27	25
Assam	84,464	76,590	161,054	20	20	20	19	19	19	19
Burma	118,364	108,087	226,451	19	18	18	17	20	19	20
Ajmer-Merwara	8,360	7,609	15,969	28	28	28	25	26	25	25

The highest rural rates were recorded in Delhi, Punjab and C. P., and the highest urban rates in Coorg, Ajmer-Merwara, U. P. and Delhi. Table I (*xx*) gives the recorded totals and rates *per mille* in rural and urban areas in British India and in the provinces.

TABLE I (*xx*).

	Deaths.			Death rate p.m.			Mean (1928-32).		
	R.	U.	Total.	R.	U.	Total.	R.	U.	Total.
British India	**5,496,279**	**600,508**	**6,096,787**	**22·4**	**22·2**	**22·4**	**25**	**28**	**25**
N.-W. F. P.	43,964	6,239	50,203	21	19	21	21	15	20
Punjab	592,092	68,450	660,542	28	21	27	25	21	25
Delhi	8,508	12,560	21,068	41	28	32	35	30	31
U. P.	792,474	112,414	904,888	17	29	18	24	38	25
B. & O.	811,925	21,472	833,397	22	15	22	25	15	24
Bengal	1,125,345	72,540	1,197,885	24	21	24	22	20	22
C. P.	367,159	44,640	411,799	26	26	26	33	35	34
Bombay	432,096	108,581	540,677	24	25	24	27	33	27
Madras	964,220	104,703	1,068,923	24	17	23	24	28	25
Coorg	3,477	454	3,931	23	47	24	24	49	25
Assam	157,736	3,318	161,054	20	17	20	19	17	19
Burma	188,004	38,447	226,451	17	27	18	18	33	20
Ajmer-Merwara	9,279	6,690	15,969	24	37	28	26	33	28

Deaths by months for different provinces and those for rural and urban areas are given on pages 317—19 of Appendix I.

For purposes of comparison, the death rates in British India and those of a number of countries are given in Table I (*xxi*).

TABLE I (*xxi*).

	Quinquennial.		Annual.				
	1921-25.	1926-30.	1929.	1930.	1931.	1932.	1933.
British India	**27·5**	**26·0**	**25·9**	**26·8**	**24·9**	**21·6**	**22·4**
England and Wales	12·2	12·1	13·4	11·4	12·3	12·0	12·3
Scotland	..	..	..	..	13·3	13·5	13·2
Belgium	13·4	13·7	15·1	13·3	13·3	13·2	13·1
Czechoslovakia	16·1	15·3	15·5	14·1	14·4	14·1	13·7
Denmark	11·3	11·1	11·2	10·8	11·4	11·0	10·6
France	17·2	16·8	17·9	15·6	16·3	15·8	15·8
Germany	13·3	11·8	12·6	11·1	11·2	10·8	11·2
Hungary	19·9	17·0	17·8	15·5	16·6	17·8	14·7
Italy	17·3	16·0	16·5	14·1	14·8	14·6	13·5
Netherlands	10·4	9·9	10·7	9·1	9·6	9·0	8·8
Norway	11·5	11·0	11·5	10·6	10·9	10·7	10·2
Portugal	20·4	18·4	17·7	17·1	16·8	17·1	17·2
Roumania	23·0	21·2	21·4	19·4	20·8	21·7	18·7
Spain	20·2	17·9	17·5	16·8	17·3	16·3	16·3
Sweden	12·1	12·1	12·2	11·7	12·5	11·6	11·2
Switzerland	12·5	12·1	12·5	11·6	12·1	12·1	11·4
Canada	11·2	11·1	11·3	10·7	10·1	9·9	9·6
New Zealand	8·6	8·6	8·8	8·6	8·3	8·0	8·0
South Africa (white)	9·7	9·7	9·5	9·7	9·4	9·9	9·3
U. S. A.	11·8	11·8	11·9	11·3	11·1	10·9	10·6
Japan	21·8	19·3	19·9	18·1	19·0	17·7	17·8
Egypt	25·4	26·2	27·7	25·0	26·8	28·8	..

The death rate for the age-period, 15—40 years, is usually higher among females than among males. Table I (*xxii*) gives total male and female deaths and death rates *per mille* for this period.

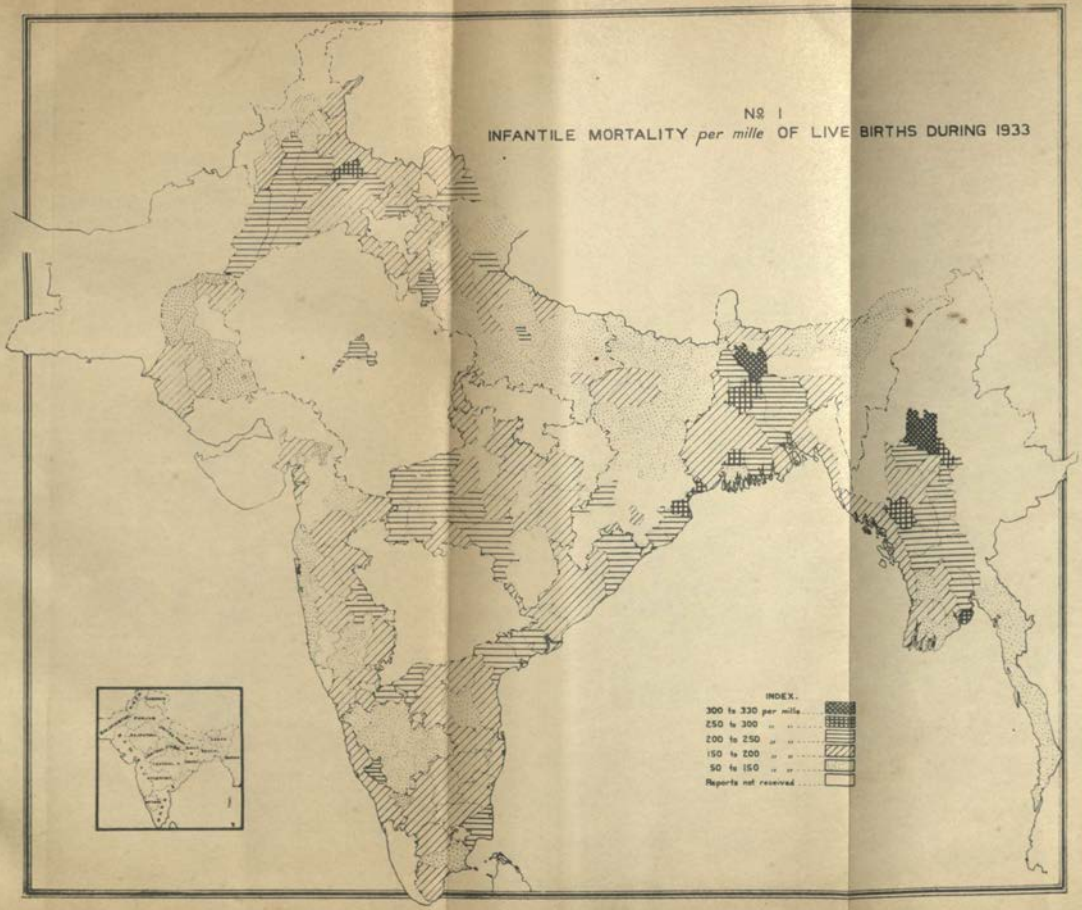
TABLE I (*xxii*).

	Deaths, 15—40 years.		Death rates 1—40 years,	
	Male.	Female.	Male.	Female.
British India	**553,622**	**622,278**	**10**	**11**
N.-W. F. P.	5,596	5,510	11	12
Punjab	51,279	53,863	10	12
Delhi	1,357	1,799	7	15
U. P.	76,732	81,061	7	8
B. and O.	87,204	90,281	11	11
Bengal	132,851	153,408	12	15
C. P.	29,589	32,224	9	10
Bombay	46,000	53,322	9	12
Madras	79,656	103,167	9	10
Coorg	616	613	14	18
Assam	17,281	21,960	11	14
Burma	24,382	23,766	9	9
Ajmer-Merwara	1,079	1,304	8	12

Death rates for the chief communities are given in Table I (*xxiii*).

TABLE I (*xxiii*).

	Hindus.		Mohammedans.		Christians.		Other Classes.	
	Deaths.	Rate. p. m.	Deaths.	Rate. p. m.	Deaths.	Rate. p. m.	Deaths.	Rate. p. m.
British India	**4,083,211**	**22·8**	**1,575,291**	**23·7**	**59,636**	**16·9**	**378,649**	**23·2**
N.-W. F. P.	2,608	15	47,527	22	68	16	...	..
Punjab	260,280	28	382,566	29	11,985	29	5,711	15
Delhi	14,935	36	5,956	29	177	10	..	..
U. P.	754,865	18	147,581	21	944	5	1,498	13
B. and O.	702,330	23	85,168	20	4,435	13	41,464	20
Bengal	497,141	23	667,409	24	2,513	14	30,822	44
C. P.	322,278	24	16,434	24	..	..	73,087	49
Bombay	454,278	27	76,808	18	3,968	13	5,623	12
Madras	963,389	24	73,807	22	30,556	18	1,171	16
Coorg	3,217	22	348	25	..	..	..	..
Assam	87,754	18	58,694	21	1,260	16	13,346	47
Burma	7,653	15	9,860	17	3,698	13	205,240	19
Ajmer-Merwara	12,483	28	3,133	32	32	5	321	15


Nº 1
INFANTILE MORTALITY per mille OF LIVE BIRTHS DURING 1933
INDEX.
300 to 330 per mille
250 to 300 " "
200 to 250 " "
150 to 200 " "
50 to 150 " "
Reports not received

Infantile mortality.

8. Totals of infant and child deaths and mortality rates per cent. of total deaths are given in Table I (*xxiv*) for British India and for the individual provinces.

TABLE I (*xxiv*).

	Under one year	%	1—5 years.	%	Total under 5 years.	%	5—10 years.	%	Total under 10 years.	%
British India	**1,650,973**	**27**	**1,083,060**	**18**	**2,734,033**	**45**	**332,295**	**5**	**3,066,328**	**50**
N.-W. F. P.	9,735	19	9,442	19	19,177	38	3,723	7	22,900	45
Punjab	200,755	30	123,200	20	323,955	50	37,862	5	361,817	55
Delhi	6,496	31	5,523	26	12,019	57	1,264	6	13,283	63
U. P.	261,780	29	182,648	20	444,428	49	36,243	4	480,671	53
B. and O.	182,116	22	170,670	20	352,786	42	49,572	6	402,358	48
Bengal	294,975	25	171,626	14	466,601	39	88,476	7	555,077	46
C. P.	137,292	33	83,870	20	221,162	53	16,246	4	237,408	57
Bombay	127,527	23	107,298	20	234,825	43	28,497	5	263,322	48
Madras	315,286	29	174,715	16	490,001	45	48,071	5	538,072	50
Coorg	857	22	455	12	1,312	34	197	5	1,509	39
Assam	40,231	25	23,519	15	63,750	40	11,781	7	75,531	47
Burma	69,397	31	26,003	11	95,400	42	9,719	4	105,119	46
Ajmer-Merwara	4,526	28	4,091	26	8,617	54	644	4	9,261	58

Of the 6,096,787 registered deaths, nearly 27% occurred amongst infants under 1 year of age; 18% amongst children between 1 and 5 years; and 5% amongst those between 5 and 10 years. In other words, over 45% of the total deaths were of children below 5 years of age and over 50% were of children below 10 years. It is illuminating to compare the corresponding figures in England and Wales for the same year. During 1933 the deaths of children under 1 year were only 7·4% of the total deaths; those amongst children between 1 and 5 years were 3·1 % of the total; and amongst children between 5 and 10 years they were only 1·4% of the total. These figures show that only 10·5 %, as compared with 45% in India, of the total deaths were among children under 5 years of age, and only 11·9%, as compared with 50% in India, were among children below 10 years of age. These striking differences must arrest the attention of all concerned with public health and preventive medicine in this country and indicate unequivocally the necessity for wider and more effective efforts not only in regard to ante-natal care, midwifery work and infant welfare but in what is sometimes considered the less direct field of general public health service. Experience during the last 75 years in England has shown that in spite of a relative absence of *direct* action by the public health services on behalf of the pre-school child, the greatest improvement in mortality during that period has been recorded among children between 1 and 5 years. In other countries the same phenomenon has occurred and there seems little reason to doubt that with a further expansion of general health services in India, a similar reduction in child mortality could be easily affected. No one can be but struck with the enormous loss of child life which the figures given above represent and, while it is by no means intended to deprecate the work now being done in connection with child welfare and maternity relief by voluntary bodies and through more official agencies, it does seem necessary to draw pointed attention to the great possibilities of attacking the problem of child mortality by devoting more attention and a larger proportion of available funds to the general improvement of environment. Pure water supplies, better conservancy and more effective removal of sewage will all have a profound effect on the appalling infant and child mortality still

taking place in this country ; these must be still considered the primary essentials of health work. For many years to come, indeed, more effective saving of infant life in India will be obtained by expansion of these primary health necessities than by the development of schemes for child welfare and maternity relief. I do not wish to be misunderstood. Active sympathy and help will always be given to those who devote time, energy and money to these schemes—for no public health official can fail to realise the urgent necessity for such work, —but during recent years there has without doubt been a tendency in certain quarters to lay the greater stress on these activities and to forget that environmental hygiene,—the hygiene of the home and the village—has an all important effect on the health of the individual. The only object of these remarks is to ensure that a true perspective of the problem is maintained ; there is no intention to belittle, far less condemn, the admirable preventive work which is being done in a large number of child welfare centres all over the country.

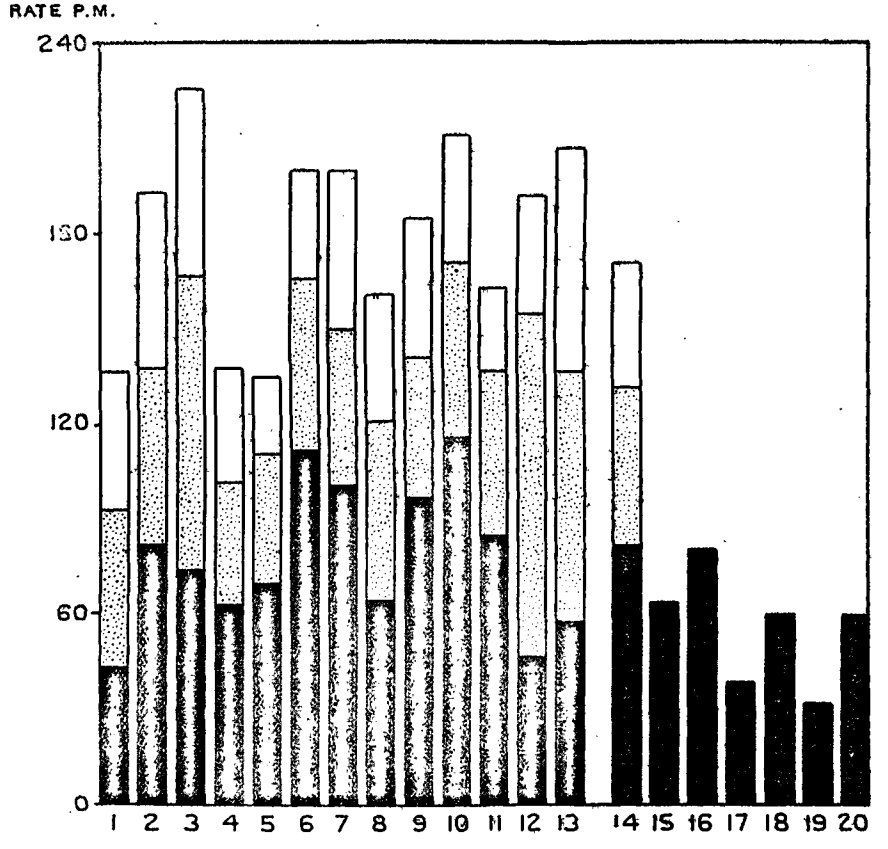
For purposes of comparison the figures for British India are given in Table I (*xxv*) along with corresponding rates recorded in some other countries.

TABLE I (*xxv*).

	Quinquennial.		Annual.				
	1921-25.	1926-30.	1929.	1930.	1931.	1932.	1933.
British India . . .	**182**	**178**	**178**	**181**	**179**	**169**	**171**
England and Wales .	76	68	74	60	66	65	64
Scotland	92	85	87	83	82	86	81
Belgium	100	95	104	93	82	87	..
Czechoslovakia . . .	155	147	143	137	134	138	127
Denmark	82	82	83	80	81	72	..
France	95	89	95	78	76	76	75
Germany	122	94	96	85	83	79	76
Hungary	187	172	179	152	162	184	139
Italy	126	119	125	106	113	..	..
Netherlands . . .	64	56	59	51	50	46	44
Norway	52	49	54	46	46	47	..
Portugal	146	146	151	144	146	..	..
Roumania . . .	..	192	197	176	180	185	174
Spain	143	124	123	117	116	111	112
Sweden	60	58	59	55	57	51	50
Switzerland . . .	65	54	52	51	49	51	48
Canada	98	93	92	89	85	73	73
New Zealand . . .	43	37	34	34	32	31	32
South Africa (white) . .	73	67	64	67	63	69	61
U. S. A.	74	68	68	65	62	59	58
Japan	159	137	142	124	132	118	..
Egypt	144	152	159	151	160	175	..

No 2

INFANTILE MORTALITY PER MILLE OF BIRTHS IN BRITISH INDIA, ENGLAND AND WALES AND BRITISH DOMINIONS IN 1933



1 N.W.F.P.
2 Punjab.
3 Delhi.
4 U.P.
5 B. & O.
6 Bengal.
7 C.P.
8 Bombay.
9 Madras.
10 Coorg.
11 Assam.
12 Burma.
13 Ajmer-Marwara.
14 British India.

TOTAL INFANTILE MORTALITY RATES.

15 England & Wales.
16 Scotland.
17 Australia.
18 Canada.
19 New Zealand.
20 Union of S.A. (white).

Of the total, 892,145 deaths were male and 758,828 female infants. Provincial details are given in Table I (*xxvi*) :—

TABLE I (*xxvi*).

	Deaths.		Rates p. m.	
	Males.	Females.	Males.	Females.
British India	**892,145**	**758,828**	**177**	**163**
N.-W. F. P.	5,471	4,264	136	139
Punjab	107,318	93,437	195	190
Delhi	3,401	3,095	229	223
U. P.	143,385	118,395	143	133
B. and O.	98,881	83,235	143	127
Bengal	156,254	138,721	205	195
C. P.	75,227	62,065	213	186
Bombay	69,270	58,257	168	153
Madras	170,618	144,668	195	174
Coorg	443	414	212	210
Assam	21,903	18,328	173	154
Burma	37,555	31,842	204	180
Ajmer-Merwara	2,419	2,107	209	206

For British India, of every 100 infants who failed to survive the first year of life, 29 died in the first week ; 19 between 1-4 weeks ; 29 between 1-6 months and 23 between 6-12 months. In Madras and Coorg 37 died in the first week, 36 in B. and O and 30 in C. P. In other provinces, the rates varied between 13 in Burma and 29 in the U. P. Of every 100 infants dying in the first month of life 61 died in the first week. Provincial figures ranged between 71 in Madras and 46 in Assam.

Of every 1,000 live births, 50 infants died during the first week of life ; provincial figures ranged from 69 in Madras to 25 in Burma.

The death rate during the first month was over 82 per 1,000 live births ; 50 p. m. between the second and the sixth month ; and 39 p. m. between the sixth and twelfth month. Tables I (*xxvii*) and I (*xxviii*) give details.

TABLE I (*xxvii*).

	Under one month.		One to six months.		6-12 months.		Total under one year.	Death rate per 1,000 live births.	
	Number.	% of total.	Number.	% of total.	Number.	% of total.		1933.	1932.
British India	**796,136**	**48**	**479,880**	**29**	**374,957**	**23**	**1,650,973**	**171**	**169**
N. W. F. P.	3,061	32	3,540	36	3,134	32	9,735	**137**	129
Punjab	85,631	43	57,749	29	57,375	28	200,755	**193**	179
Delhi	2,117	33	2,689	41	1,690	26	6,496	**226**	191
U. P.	119,525	46	74,699	28	67,556	26	261,780	**138**	163
B. & O.	94,569	52	54,742	30	32,805	18	182,116	**135**	129
Bengal	165,359	56	78,801	27	50,815	17	294,975	**200**	179
C. P.	69,278	50	33,720	25	34,294	25	137,292	**200**	201
Bombay	51,640	40	44,675	35	31,212	25	127,527	**161**	156
Madras	165,177	52	75,427	24	74,682	24	315,286	**185**	183
Coorg	473	55	221	26	163	19	857	**211**	224
Assam	20,982	52	12,858	32	6,391	16	40,231	**163**	157
Burma	17,060	25	39,023	56	13,314	19	69,397	**192**	185
Ajmer-Merwara	1,264	28	1,736	38	1,526	34	4,526	**207**	207

TABLE I (*xxviii*).

	Deaths under one week.	Rate p. m. live-births.	Percentage of: Deaths under one month.	Percentage of: Total infants deaths.
British India	**483,681**	**50**	**61**	**29**
N.-W. F. P.	1,597	23	52	16
Punjab	48,224	46	56	24
Delhi	1,237	43	58	19
U. P.	75,008	39	63	29
B. & O.	65,916	49	70	36
Bengal	85,025	58	51	29
C. P.	41,192	60	59	30
Bombay	28,678	36	56	22
Madras	116,983	69	71	37
Coorg	319	79	67	37
Assam	9,628	39	46	24
Burma	9,170	25	54	13
Ajmer-Merwara	704	32	56	16

Of the total, 376,022 deaths occurred during the first quarter, 385,532 during the second, 404,852 during the third and 484,567 during the fourth quarter.

Mortality figures for the different classes of population are recorded in 7 provinces only and are given in Table I (*xxix*).

TABLE I (*xxix*).

	Hindus.		Mohammedans.		Christians.		Other classes.	
	Deaths.	Rate p. m.	Deaths.	Rate p.m.	Deaths.	Rate p. m.	Deaths.	Rate p. m.
N.-W. F. P.	642	126	9,059	138	34	309	..	..
Punjab.	81,425	186	113,927	197	3,778	201	1,625	227
Delhi	4,601	241	1,849	199	46	144	..	..
B. & O.	156,854	140	18,401	130	1,013	115	5,848	705
Madras	23,922	212	3,706	191	1,122	133	221	239
Coorg	738	200	84	343	25	232	10	435
Ajmer-Merwara	3,474	200	967	242	7	119	78	170

In the *Madras Presidency*, the urban death rate generally exceeds the rural death rate but in the first week of life the rural death rate is appreciably higher than the urban due probably to a smaller proportion of cases in the former receiving skilled aid.

In the *Punjab*, the total infantile death rate was 14 p. m. in excess of the figure for 1932 and 6·7 p. m. higher than the decennial average. The increase was attributed to the prevalence of malaria and smallpox. In the *U. P.*, both rural and urban death rates were lower than that in 1932 and the decennial

* Municipalities only.

mean. In *Bengal*, 16 districts showed an increase over the decennial mean and 10 districts recorded decreases. Compared with the decennial average, the death rate for males increased in 14 districts and the rate for females increased in 18. In *Assam*, the death rate was higher than that in the preceding 3 years, but was lower than the rates recorded prior to 1930. In the *C. P.*, the death rate was the lowest on record.

Provincial rural and urban infantile death rates are given in Table I (*xxx*). Rural rates were higher than urban in Delhi, Coorg, Assam and Bengal; other provinces recorded higher urban rates.

TABLE I (*xxx*).

	Rural.		Urban.	
	Deaths.	Rate p. m. live births.	Deaths.	Rate p. m. live births.
British India	**1,472,384**	**164**	**178,589**	**210**
N.-W. F. P.	8,187	134	1,548	162
Punjab	178,188	192	22,567	194
Delhi	2,501	248	3,995	214
U. P.	221,947	129	39,833	218
B. & O.	176,673	134	5,443	164
Bengal	280,076	200	14,899	199
C. P.	121,800	200	15,492	202
Bombay	96,849	148	30,678	219
Madras	286,315	183	28,971	205
Coorg	833	224	24	69
Assam	39,472	164	759	127
Burma	57,314	182	12,083	267
Ajmer-Merwara	2,229	149	2,297	334

A list of towns recording high infantile death rates will be found in Appendix I (pages 324-26); recorded rates for 1932 and 1933 in Presidency and provincial headquarter towns are given in Table I (*xxxi*). The three Presidency cities all recorded considerable increases in rates.

TABLE I (*xxxi*).

	1933.	1932.
Bombay	270	219
Calcutta	275	246
Madras	268	239
Rangoon	257	366
Nagpur	248	244
Allahabad	212	222
Lucknow	264	266
Delhi	233	201
Lahore	187	228
Peshawar	203	190

Causes of Infantile Mortality.

9. Unfortunately it is not possible to throw any new light on this problem. Certain figures have been prepared for Delhi Province and these indicate that fevers and respiratory diseases were responsible for over 75% of the total infant deaths. Table I (*xxxii*) gives comparative figures for 1933 and 1932 for Delhi Province and these are probably illustrative of conditions in other parts of Northern India at least.

TABLE I (*xxxii*).

	1932.	1933.
Smallpox	68	297
Fever	2,777	2,799
Malaria	..	17
Measles	39	44
Diarrhoea	96	178
Respiratory diseases	1,280	1,090
Infantile convulsions	7	11
„ debility	8	929
Ulcer and boils	..	17
Premature birth	44	42
Whooping cough	..	181
Pneumonia	640	235
Typhoid fever	59	78
Sun-stroke	35	..
Phthisis	..	1
Dysentery	27	37
Other causes	277	540

Table I (*xxxiii*), which gives figures for the chief causes of infantile mortality in Bombay city, is reproduced once more from the annual report of the Health Officer. These figures may be taken as representing conditions in the more southern parts of India.

TABLE I (*xxxiii*).

	1929.	1930.	1931.	1932.	1933.	Mean 1929-33.
All causes	7,225	7,506	7,401	6,298	8,320	7,350
Smallpox	240	449	2	69	717	295
Measles	37	41	15	16	18	25
Malaria	18	13	5	4	9	10
Remittent and undefined fever	169	203	198	147	167	177
Diarrhoea and enteritis	303	350	366	280	414	343
Dysentery	23	39	34	27	19	28
Debility, malformations and premature birth.	2,779	2,791	2,987	2,685	3,019	2,852
Respiratory diseases	2,523	2,529	2,646	2,217	2,828	2,549
Convulsions	662	626	620	422	594	645
Other causes	471	425	528	431	535	478

Still-births.

10. Table I (*xxxiv*) gives the numbers of recorded still-births in the different provinces, but the figures probably fail to indicate actual conditions.

TABLE I (*xxxiv*).

	Number.	Rate p. m. live-births.
British India	**189,081**	**20**
N.-W. F. P.	232	3
Punjab	12,297	12
Delhi	400	14
U. P.	15,286	8
B. & O.	44,439	33
Bengal	52,481	34
C. P.	14,673	21
Bombay	12,576	16
Madras	22,315	13
Coorg	..	..
Assam	9,395	38
Burma	4,900	14
Ajmer-Merwara	87	4

In the N.-W. F. P. 149 were male and 83 female still-births; 198 were recorded among Muhammedans and 33 among Hindus. In the Punjab, 7,082 male and 5,215 female still-births were recorded and in B. & O. 24,822 and 19,617 respectively. In Madras Presidency, 16,272 were recorded in rural and 6,043 in urban areas. In the Bombay Presidency, the percentage of still to live births varied between 1 for Thar and Parkar district and 76 in Bombay city. In Delhi Province, male still-births totalled 219 and female 181.

Registration.

11. In *Delhi Province*, registration has been in force in Delhi city from 1890, in the notified area from 1914, in Delhi Cantonment from 1916, and in New Delhi from 1925. The municipalities have framed byelaws to ensure more correct reporting. In *B. & O.*, registration is compulsory in all the 58 municipal towns but not in rural areas; the police is the reporting agency in the latter and also in most municipalities. In order to improve registration in this province, an attempt has been made recently to transfer the responsibility of collection, tabulation and verification of vital statistics to the health staffs of the larger municipalities and the results have been satisfactory. *Bengal* is the only province in which registration of births and deaths is compulsory in all urban and rural areas, but the system of registration, collection and transmission of vital statistics continued to work unsatisfactorily as far as the district returns were concerned. In *Madras Presidency*, the Births and Deaths Registration Act (III of 1899) is compulsory in those areas to which it has been extended. The transfer of the compilation of vital statistics for non-municipal areas to the office of the D. P. H. has been followed by greater accuracy. In *Assam*, registration is compulsory in 26 municipal towns; but not

in rural areas and *chaukidars* and *gaonbaras* carry out this work in addition to their other duties. In hill districts it is partially carried out; in the tea gardens it is compulsory under the Bengal Births and Deaths Registration Act, 1873.

Indian States.

12. Only a few Indian States submit their vital statistics and these have been summarised in Table I (*xxxv*). Registration in these States is no more reliable than it is in British India.

TABLE I (*xxxv*).

State.	Population.			Births.			Birth rate p. m.	Total deaths.	Death rate p. m.
	M.	F.	Total.	M.	F.	Total.			
Jind	176,383	148,293	324,676	7,738	7,274	15,012	46	8,151	25
Suket	29,859	28,549	58,408	626	577	1,203	21	988	17
Kalsia	33,306	26,542	59,848	1,209	1,044	2,253	38	1,270	21
Maler Kotla	Not available.		80,322	1,051	719	1,770	21	1,081	13
Baghat	5,757	3,996	9,753	74	47	121	12	92	10
Jawhar	29,502	27,759	57,261	1,232	1,236	2,468	43	1,083	19
Dhrol	13,614	14,039	27,653	679	657	1,336	48	656	24
Kolhapur	476,105	453,153	929,258	18,515	17,238	35,753	38	23,753	26
Mysore	3,284,554	3,138,635	6,423,189	60,214	57,706	117,920	18	106,009	16

Mysore State.—Birth rates varied from 21 p. m. in Kolar district to 14 in Hassan and death rates from 14 p. m. in Bangalore to 27 in Chitaldrug. The birth rate in rural areas was 16 p. m. and in urban areas 28; the corresponding death rates were 16 and 19. The death rate was highest in November and the lowest in February. Infantile deaths numbered 11,733 giving a rate of 66 per 1,000 live-births.

Hyderabad State.—(7th October, 1931, to 5th October, 1932)—Registered births and deaths totalled 126,294 and 98,629, giving rates of 9 p. m. and 7 p. m., respectively.

SECTION II.

HISTORY OF CHIEF DISEASES.

Chief causes of mortality.

13. Table II (*i*) and diagram No. 3 give total deaths and rates *per mille* for the chief groups of diseases under which deaths are registered in British India, but these figures cannot be regarded as giving an accurate picture of mortality as there is nowhere in India complete registration of deaths by causes. The "Fevers" group, no doubt including most of the deaths in which fever was a notable symptom of the fatal illness, is once more the largest and comprises nearly 58 % of the total deaths with a death rate of 12·9 p. m. Deaths recorded under "other causes" seem to remain fairly constant as the percentage to the total, *viz.*, 27 %, and the death rate 6·1 p. m. are both much the same as last year. The respiratory diseases group comprises 7 % of the total and give a death rate of 1·6 p. m., both figures also being similar to those of 1933. The only deaths which are registered with a reasonable standard of accuracy are those from cholera, plague and smallpox, but even in these instances the absence of death certification makes the recorded figures somewhat incomplete and unreliable. Deaths from true cholera are frequently registered as "diarrhœa" and deaths from dysentery and diarrhœa as frequently find their way into the cholera category; smallpox deaths are recorded as measles and chickenpox and *vice versa*, whilst, owing to the ignorance or carelessness of those responsible for registration, cases in which fever has been a marked feature of the illness are buried under the omnibus term "fevers". As regards "other causes" a large proportion of these deaths in Burma were ascribed to debility and anaemia, circulatory, urinary and digestive diseases; in the C. P. 3,457 deaths followed child-birth, 2,452 were due to measles and chickenpox and the remaining 105,631 to causes "for which there is no separate column in the vital statistics form or which the reporting agency was unable to classify". In other provinces similar conditions prevail. The methods in vogue detract greatly from the epidemiological value of the recorded statistics and little improvement can be expected until suitable registration agencies are constituted. Generally speaking, this will be a difficult problem for many years to come, but there are nevertheless a number of minor improvements which could be introduced without much delay, difficulty or expense. These include (1) the compulsory certification of causes of deaths in urban areas; (2) the adoption in prescribed areas of the International 'short' list of causes of death and (3) a uniform extension of the present list of notifiable diseases. Valiant efforts have been made in certain provinces during recent years to verify at least a proportion of the recorded deaths and, as might have been anticipated, wide variations have been obtained between the figures returned by the ordinary and the verifying agencies. At the same time, until some system of this kind is generally adopted, the statistics of mortality in India dealt with in this section must remain mere approximations and can only be used for analytical purposes with considerable reserve.

With the transfer of "public health" in 1919 to local Governments the onus of initiative in improving registration has lain on provincial health departments and whilst in certain provinces considerable and successful efforts have been made in this direction, generally throughout India the results achieved have been so far disappointing.

Table II (*ii*) gives the male and female deaths and rates *per mille* of the more important registered groups of diseases for British India and for the various provinces. In later paragraphs in this section, the incidence of these diseases is more fully discussed, but here it may be noted that, whilst the mortality from plague and "fevers" remained more or less stationary, most of the other groups of diseases showed increases over the previous year.

Few important changes have been made in the table of notifiable diseases published in last year's report. Owing perhaps to the increasing prevalence in recent years of cerebrospinal fever, this disease was declared notifiable in *Bombay Presidency* and influenza and typhoid fever have been declared to be dangerous diseases in the *Bengal Presidency*, for purposes of the Bengal Municipal Act (XV of 1932), during epidemic prevalence of these diseases. In the urban areas of *Burma*, cholera, plague, smallpox, beri-beri, epidemic dropsy, typhoid and paratyphoid A and B are now notifiable diseases under section 2 (6) of the Burma Municipal Act as is the typhus fever group under a notification of the local Government. In the rural areas of this province also, rule 18, read with section 29 (1) (*d*) and (*h*) of the Burma Village Manual, regulates the notification of plague, cholera, smallpox or unusual sickness or mortality from whatever cause. In *Madras Presidency* municipal areas, if a medical practitioner becomes cognizant of the existence of any dangerous disease in any private or public dwelling (not being a public hospital) he is required to inform the Chairman with the least practicable delay. With the previous approval in all cases of the Collector of the district, the Chairman may direct the compulsory notification by the owner or occupier of every house within municipal limits during such period of all deaths from or occurrence of dangerous diseases in his house. In this province, the following diseases are notifiable in municipal areas:—Acute influenzal pneumonia, anthrax, chickenpox, cholera, diphtheria, glanders, leprosy, plague, smallpox, tuberculosis, typhoid fever, influenza, relapsing fever and rabies. In the case of local boards, smallpox cases are notifiable to the President of the district board or village headman.

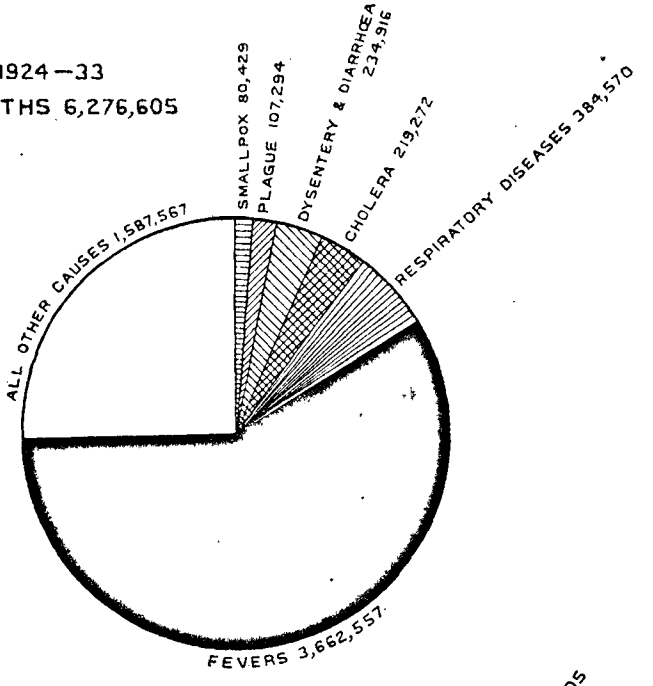
As regards *Delhi Province*, most of the infectious diseases are still not notifiable in Delhi city, so that only for measles and chickenpox are the records reliable. In rural areas, the notifiable diseases include cholera, smallpox, plague and cerebrospinal fever.

№ 3

BRITISH INDIA

COMPARATIVE DIAGRAMS OF DEATHS BY CAUSES

MEAN 1924—33
TOTAL DEATHS 6,276,605



YEAR 1933—
TOTAL DEATHS 6,096,787

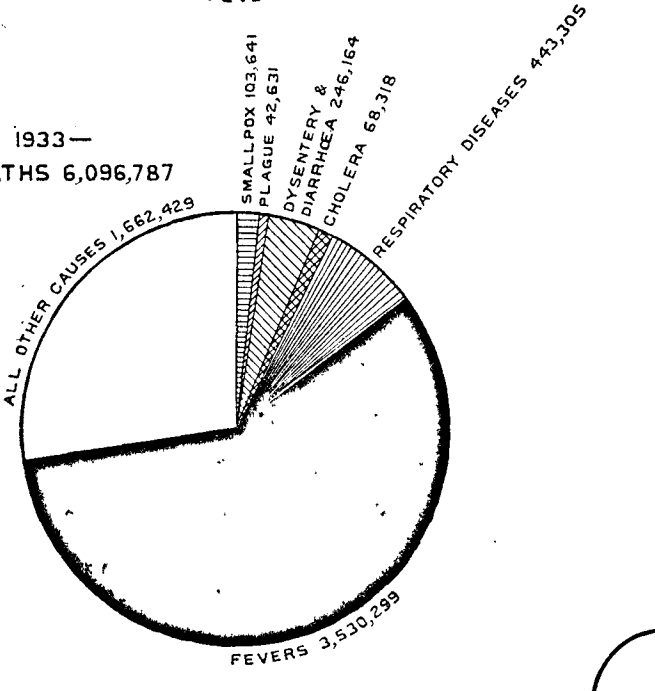


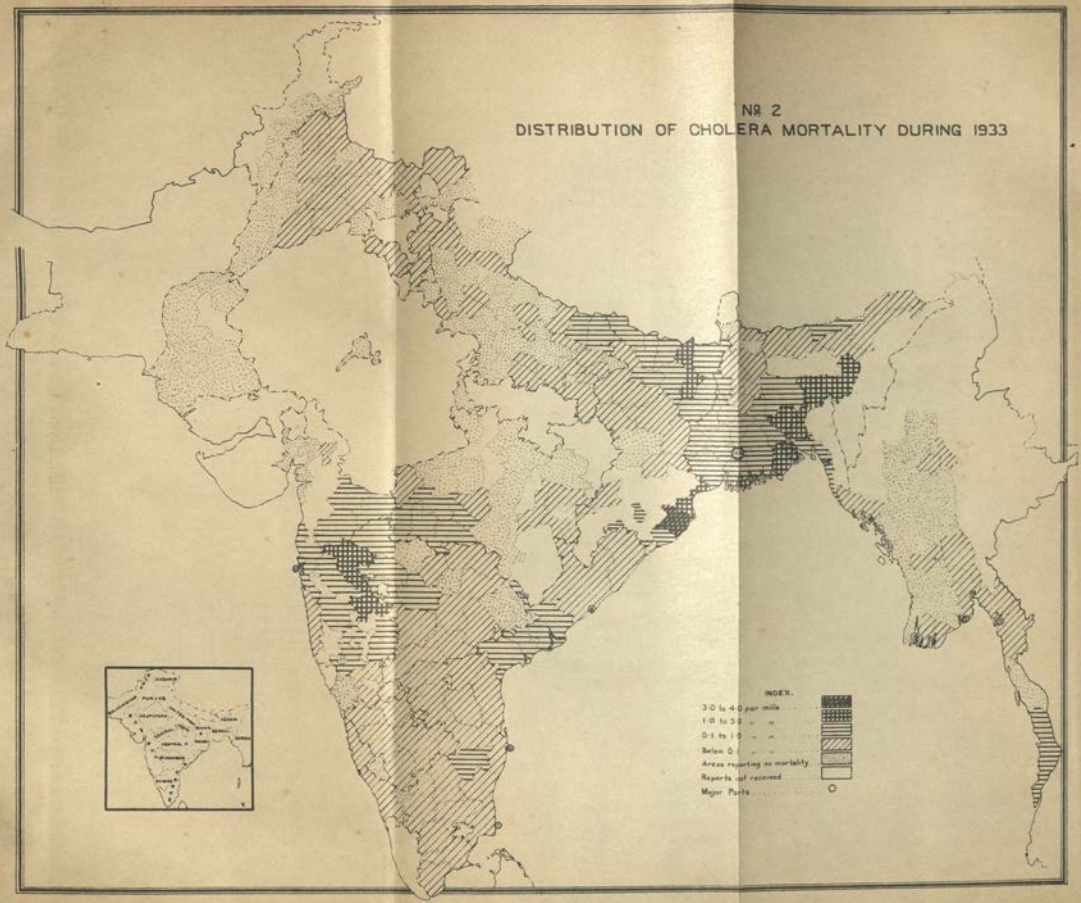
TABLE II (*i*).

	Cholera.		Smallpox.		Plague.		Fevers.		Dysentery and Diarrhoea.		Respiratory Diseases.		Other causes.		Total.	
	Deaths.	Rate p.m.	Deaths	Rate p.m.	Deaths.	Rate p.m.	Deaths.	Rate. p.m.	Deaths.	Rate p.m.	Deaths.	Rate p.m.	Deaths.	Rate p.m.	Deaths.	Rate p.m.
British India .	**68,318**	**0·3**	**103,641**	**0·4**	**42,631**	**0·2**	**3,530,299**	**12·9**	**246,164**	**0·9**	**443,305**	**1·6**	**1,662,429**	**6·1**	**6,096,787**	**22·4**
N.-W. F. P. . .	..	..	1,532	0·7	..	..	40,570	16·8	289	0·1	2,754	1·1	5,058	2·1	50,203	20·8
Punjab . .	160	..	11,626	0·5	1,789	0·1	460,781	18·9	12,345	0·5	55,337	2·3	118,554	4·9	660,542	27·1
Delhi . .	..	..	948	1·4	..	..	11,038	16·7	616	0·9	4,463	6·8	4,003	6·1	21,068	31·9
U. P. . . .	1,915	..	9,844	0·2	9,835	0·2	698,173	14·1	11,501	0·2	34,898	0·7	138,722	2·8	904,888	18·2
B. & O. . .	17,514	0·5	42,674	1·1	1,635	..	574,548	14·9	17,064	0·4	6,295	0·2	173,667	4·5	833,397	21·6
Bengal. . .	29,242	0·6	15,426	0·3	1	..	812,393	16·1	46,697	0·9	82,173	1·6	211,953	4·2	1,197,885	23·7
C. P. . . .	2,152	0·1	561	..	1,200	0·1	231,851	14·5	22,232	1·4	32,134	2·0	121,669	7·6	411,799	25·7
Bombay . .	7,797	0·4	7,741	0·4	24,560	1·1	196,527	8·8	23,162	1·0	100,200	4·5	180,690	8·1	540,677	24·1
Madras . .	3,851	0·1	10,745	0·2	2,591	0·1	300,182	6·4	97,584	2·1	105,828	2·3	548,142	11·8	1,068,923	22·9
Coorg . . .	..	..	14	0·1	48	0·3	3,058	18·6	122	0·7	179	1·1	510	3·1	3,931	24·0
Assam . .	5,508	0·7	247	..	..	..	103,890	12·7	9,267	1·1	5,444	0·1	36,698	4·5	161,054	19·8
Burma. . .	179	..	1,506	0·1	972	0·1	85,816	6·9	4,902	0·4	12,043	1·0	121,033	9·8	226,451	18·3
Ajmer-Merwara .	..	..	777	1·4	..	..	11,522	20·3	383	0·7	1,557	2·7	1,730	3·0	15,969	28·1

TABLE II (*ii*).

	Cholera.				Smallpox.				Plague.			
	Deaths.		Rate p.m.		Deaths.		Rate p.m.		Deaths.		Rate p.m.	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
British India	35,592	32,726	0·2	0·2	52,525	51,116	0·4	0·4	19,248	23,383	0·1	0·2
N.-W. F. P.	...	...	...	...	801	731	0·6	0·7	...	...	...	...
Punjab	99	61	...	...	5,965	5,661	0·5	0·5	757	1,832	0·1	0·1
Delhi	...	...	...	...	467	481	1·2	1·7	...	...	...	...
U. P.	1,038	877	...	...	5,029	4,815	0·2	0·2	4,119	5,716	0·1	0·2
B. & O.	8,677	8,837	0·4	0·4	21,472	21,202	1·1	1·1	627	1,008	...	0·1
Bengal	15,654	13,588	0·6	0·6	7,910	7,516	0·3	0·3	1	...	...	...
C. P.	1,120	1,032	0·1	0·1	287	274	...	...	603	597	0·1	0·1
Bombay	3,981	3,816	0·4	0·4	3,971	3,770	0·4	0·4	11,339	13,221	1·0	1·2
Madras	2,008	1,843	0·1	0·1	5,215	5,530	0·2	0·2	1,222	1,369	...	0·1
Coorg	...	...	...	...	5	9	...	...	29	19	0·3	0·3
Assam	2,903	2,605	0·7	0·7	136	111	...	...	...	...	...	...
Burma	112	67	...	...	892	614	0·1	0·1	551	421	0·1	0·1
Ajmer-Merwara	...	...	...	...	375	402	1·2	1·5	...	...	...	...

	Fevers.				Dysentry and Diarrhoea.				Respiratory Diseases.			
	Deaths.		Rate p.m.		Deaths.		Rate p.m.		Deaths.		Rate p.m.	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
British India	1,823,795	1,706,504	13·0	12·9	127,666	118,498	0·9	0·9	248,320	194,985	1·8	1·5
N.-W. F. P.	21,585	18,985	16·6	17·1	169	120	0·1	0·1	1,536	1,218	1·2	1·1
Punjab	235,816	224,915	17·8	20·3	6,581	5,764	0·5	0·5	30,695	24,642	2·3	2·2
Delhi	5,332	5,706	13·9	20·5	331	285	0·8	1·0	2,356	2,107	6·2	7·2
U. P.	374,737	323,436	14·5	13·7	5,998	5,503	0·2	0·2	18,240	16,658	0·7	0·7
B. & O.	496,768	277,780	15·4	14·3	8,906	8,158	0·5	0·4	3,557	2,738	0·2	0·1
Bengal	409,644	402,749	15·6	16·6	24,309	22,388	0·9	0·9	50,644	31,529	1·9	1·3
C. P.	121,924	109,927	15·2	13·7	11,615	10,617	1·5	1·3	19,014	13,120	2·4	1·6
Bombay	100,284	96,245	8·5	9·0	12,096	11,066	1·0	1·0	54,638	45,562	4·8	4·3
Madras	149,878	150,304	6·5	6·4	49,776	47,808	2·2	2·1	56,420	49,408	2·4	2·1
Coorg	1,533	1,525	16·8	20·8	76	46	0·8	0·6	133	46	1·5	0·6
Assam	55,279	48,611	12·9	12·7	4,939	4,328	1·1	1·1	3,255	2,189	0·8	0·6
Burma	44,951	40,865	7·1	6·7	2,681	2,221	0·4	0·4	7,021	5,022	1·1	0·8
Ajmer-Merwara	6,066	5,456	20·2	20·4	189	194	0·6	0·7	811	746	2·7	2·8


№ 2
DISTRIBUTION OF CHOLERA MORTALITY DURING 1933
INDEX.
3·0 to 4·0 per mille
1·0 to 3·0 " "
0·1 to 1·0 " "
Below 0·1 " "
Areas reporting no mortality
Reports not received
Major Ports

Cholera.

(a) *General.*

14. During 1932 and 1933 the incidence of cholera was the lowest recorded in India during the last 60 years. In the former year, the long-wave cholera cycle was at its minimum and it was anticipated that 1933 would record an increase. This increase duly occurred though it was slight and most of the cholera was confined to the western districts of the C.P., to the eastern districts of Bombay Presidency and to Hyderabad State, with an exacerbation in Assam. Total recorded deaths numbered 68,318 as against 67,219 in 1932 and these figures compare very favourably with that of 354,438 which is the mean for the 5-year period 1928—32. Throughout the 57-year period from 1877 to 1933 for which reliable records are available, only in 12 years have recorded deaths been fewer than 200,000 ; in the other 45 years cholera has regularly been the cause of a very high mortality, the deaths varying between 217,000 in 1893 and nearly 800,000 in 1900.

In the form of a concentrated picture of past and present events the recorded cholera deaths by quinquennial periods from 1877 onwards are given below :—

Period.	Total deaths.	Annual average.
1877—81	1,468,487	293,697
1882—86	1,457,114	291,423
1887—91	2,030,020	406,004
1892—96	2,243,590	4,448,718
1897—01	1,942,016	388,403
1902—06	1,862,132	372,426
1907—11	2,023,514	404,703
1912—16	1,675,833	335,167
1917—21	1,986,978	397,396
1922—26	742,184	148,437
1927—31	1,509,680	301,936
1932	67,219	67,219
1933	**68,318**	**68,318**

These figures show that the violently explosive outbreaks of earlier years are now less frequent. Map No. 2 compared with those published in previous reports also illustrates the same point. This feature reflects credit on the publicity and preventive campaigns launched by provincial public health departments, the Indian Red Cross and other voluntary associations. Although every province still ordinarily shows its own seasonal curve, it is satisfactory to note that all have shared in the general decline,

Judging from the provisional data now available, the cholera wave has continued to rise during 1934, so that the usual cycle seems to be in course of development. At the same time, no very severe epidemic is anticipated ; the large decline in incidence during recent years, as compared with the high peaks recorded during the last decade of the 19th century and the early years of the present century, suggests that certain new factors have been at work throughout the country in reducing the severity of this endemic disease. Whilst, therefore, the long wave cycle is still in evidence and an increased incidence is likely to be recorded during the next two to three years, there is every hope that the cholera mortality figures will not reach undue dimensions. This hope is born of the knowledge that preventive work during recent years has

been peculiarly successful in all the larger *melas* and religious gathering, where millions of pilgrims are wont to attend. Almost without exception public health departments have reported a complete absence of cholera during and after these gatherings which were formerly such hot-beds of infection and this alone must have the most profound influence on the incidence of the disease over wide tracts of the country. Another factor of importance is the increasing use of anti-cholera vaccine which is now well known to give a high degree of protection. The continued cheapness of food grains and the prevention of anything approaching famine conditions are additional factors favouring the reduction and control of cholera outbreaks. Speaking generally, therefore, it seems unlikely that in the future India will ever again suffer so severely from this disease as it has done in the past, although this will of course depend on continued vigilance on the part of every public health department and on immediate action when outbreaks occur. Whilst some cause for optimism exists, however, there is nothing in the present situation which can permit of any relaxation on the part of public health officers; rather does it require renewed effort in order that India may eventually become free of this dreaded scourge.

As compared with the previous year, B. & O. and Bombay Presidency recorded considerable increases; in the C. P. and Assam, the increases were small; the U.P., Bengal and Madras reported decreases: the Punjab and Burma experienced only sporadic or mild outbreaks; N.-W. F. P., Coorg and Ajmer-Merwara remained free. Reduced incidences were particularly marked in the central areas of the Indus and Ganges valleys, *i.e.*, Punjab, U. P. and Bengal. In the last province, the cholera curve reached a remarkably low level in September, as can be seen from Chart No. 4. Table II (*iii*) gives the numbers of deaths for British India and the various provinces.

TABLE II (*iii*).

	1931.	1932.	1933.
Total	220,909	67,219	68,318
N.-W. F. P.	105	70	..
Punjab	391	614	160
Delhi	61	4	..
U. P.	31,118	9,734	1,915
B. & O.	40,943	9,348	17,514
Bengal	79,073	33,910	29,242
C. P.	14,135	854	2,152
Bombay	18,646	1,353	7,797
Madras	30,232	5,278	3,851
Coorg	116	..	..
Assam	5,523	4,971	5,508
Burma	534	1,082	179
Ajmer-Merwara	32	1	..

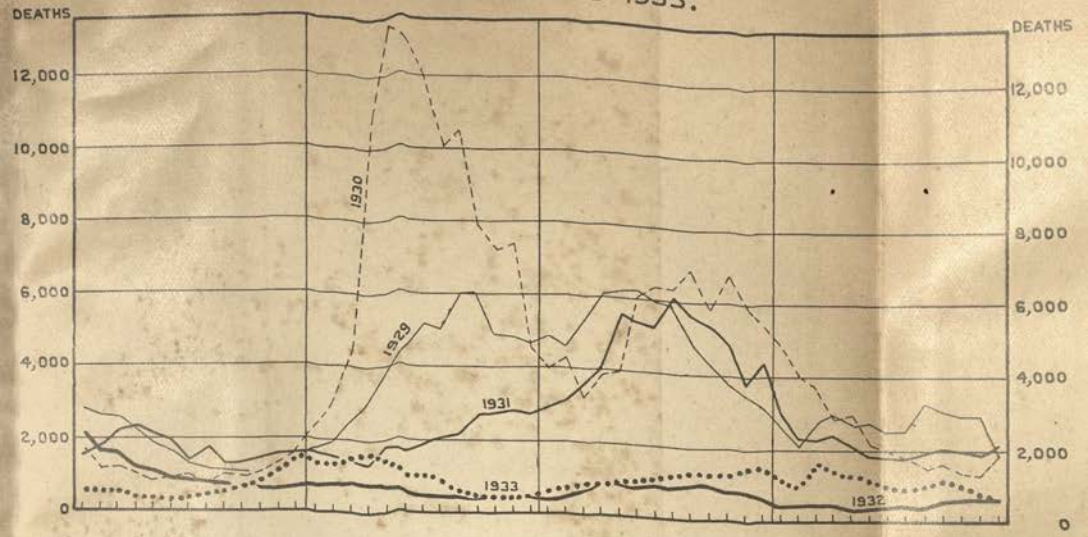
Once more it is of interest to compare these figures with the forecast of probable cholera incidence for 1933 made by Sir Leonard Rogers. His forecast runs as follows:—

"*Assam.*—1932 rains normal; recent incidence low. Forecast—about average incidence in 1933.

Bengal.—Monsoon slight defect of 12 per cent.; low recent incidence. Forecast—some increase in 1933 on the incidence of recent years

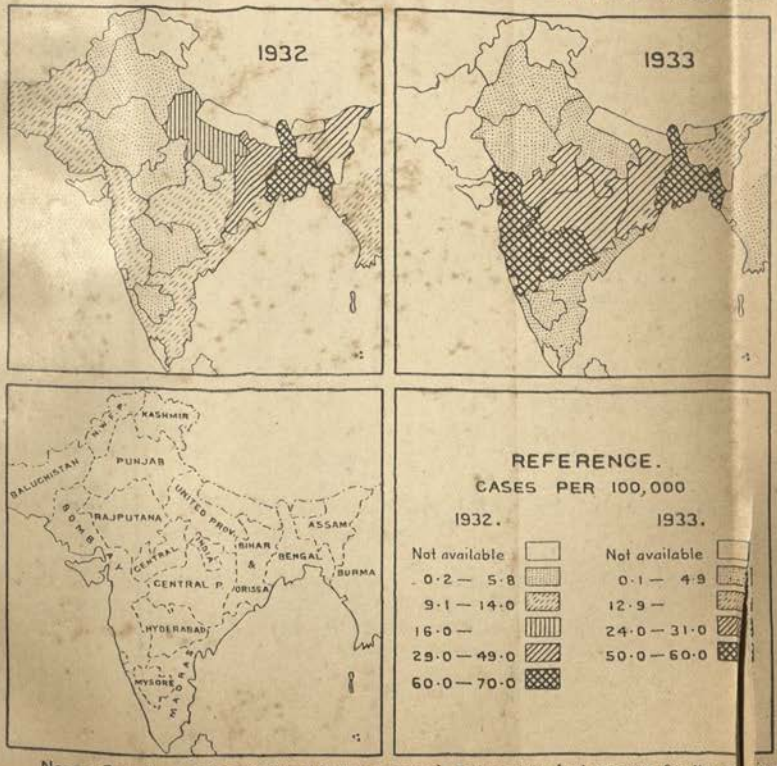
№ 4

WEEKLY NUMBER OF DEATHS FROM CHOLERA IN INDIA FROM 1929 TO 1933.



CHANGES IN THE GEOGRAPHICAL DISTRIBUTION OF CHOLERA IN INDIA DURING 1932 & 1933

(CASES REPORTED PER 100,000 INHABITANTS IN EACH PROVINCE.)



NOTE.- Based on data published in the League's Epidemiological reports for the period November-December 1933 & 1934 (R.E.170 & R.E. 176.)

Orissa.—June to September rains normal, but October rain low with deficiency in the north Madras districts to the south of Orissa. Forecast—increased incidence in 1933.

Bihar.—Monsoon rains to September, 34 per cent. deficient, and also low in October, low cholera incidence in last two years. Forecast—increased incidence in 1933; this may be considerable if the winter rains are also short. Chota Nagpur will be liable to cholera infection from Bihar and Orissa.

United Provinces.—1932 rains 22 per cent. in defect in the east, but normal in the west; cholera incidence very low in 1932. Forecast—increased incidence in 1933, especially in the eastern districts.

Punjab.—1932 rains normal; recent cholera incidence low. Forecast—not likely to be epidemic, but some spread from the United Provinces probable.

North-West Frontier Province.—Monsoon in 1932 in excess; low recent prevalence. Forecast—not epidemic but may be some spread from the Punjab.

Sindh.—1932 rains in considerable excess. Forecast—cholera incidence likely to be low.

Gujerat.—Normal rains. Forecast—no excess of cholera likely.

Bombay Deccan.—Good rains. Forecast—cholera prevalence likely to be average to low.

Central Provinces.—1932 monsoon in moderate excess; very low cholera in 1932. Forecast—average to low prevalence, but probably above that of 1932.

South-East Madras.—Good October rains 1932, incidence low in 1932. Forecast—about the average unless the November to January rains are in defect.

North Madras Coast.—Low 1932 monsoon rains, low cholera in 1932. Forecast—increased prevalence in 1933, with incidence above the average".

Table II (*iv*) gives the numbers of cases registered during each quarter in 1932 and 1933. At the beginning of the year cholera disappeared completely from most districts of Madras Presidency. On the other hand, the disease spread to the Deccan, infecting the western districts of the C. P., Hyderabad and the mountainous districts of Bombay Presidency. Nearly 79 % of the total cases in the first quarter and 54 % in the second quarter occurred in Bengal alone. High incidences were also recorded during the second quarter in Bombay Presidency and Hyderabad State. Whilst the situation in Bengal Presidency improved in the third quarter, the epidemic during these months reached its climax in the Deccan; in B. & O. the districts of North Behar, specially Darbhanga, Champaran and Muzaffarpur, suffered a mild epidemic at the close of the monsoon. During the last quarter, an epidemic was reported in the valleys of Assam; the disease also broke out in Madras Presidency, reaching its height in December. These local epidemics, however, had only a moderate effect on the mortality curve for the whole of India, as they were counter-balanced by the reduced incidence of the winter outbreak in Bengal.

In British India as a whole the maximum mortality occurred in April; in Bengal and U. P. in April; in Bombay Presidency in July; in C. P. in September; in B. & O. in October; in Assam in November; in Madras Presidency in December. These provincial maxima were generally in accordance with past experience.

TABLE II (*iv*).

	1st		2nd		3rd		4th	
	1932.	1933.	1932.	1933.	1932.	1933.	1932.	1933.
Total . .	25,720	51,582	15,473	24,220	18,355	30,076	10,801	26,976
N.-W.F. P. .	..	..	..	..	88	..	..	..
Kashmir .	..	..	..	..	..	..	..	..
Punjab . .	..	3	118	42	924	139	19	107
Punjab States .	..	..	59	8	55	..	..	..
Delhi . .	..	..	..	1	6	1	..	..
U. P. . .	210	244	1,306	1,291	5,256	194	959	31
B. & O. . .	1,072	1,411	3,470	1,353	4,636	5,786	1,827	5,022
Bengal . .	15,813	12,287	7,427	12,975	3,798	1,349	4,963	2,930
Bengal States .	9	2	8	69	..	..	..	1
C. P. . .	49	85	92	614	1,241	3,647	477	1,700
C. I. Agency .	14	22	6	40	73	1,487	..	327
Bombay . .	275	1,061	55	3,186	640	8,820	1,602	3,714
Bombay States	..	8	15	198	..	1,316	19	473
Hyderabad State . .	62	164	53	3,408	5	4,721	26	1,143
Mysore State .	6	..	4	4	..	5	..	7
Madras . .	6,380	141	581	65	208	2,240	126	5,467
Assam . .	1,059	138	1,745	720	827	225	479	6,023
Burma . .	769	14	531	179	144	143	19	8
Ajmer-Merwara	..	2	..	..	..	..	..	..
Other Indian States . .	2	..	3	67	454	3	285	23

Table II (*v*) gives details for rural and urban areas with death rates for each province. That the former were generally higher than the latter suggests association of defective water supplies with the causation and spread of the disease.

TABLE II (*v*).

	Rural.		Urban.	
	Deaths.	Rate p. m.	Deaths.	Rate p. m.
Total	64,061	0·3	4,257	0·2
N.-W. F. P.	..	..	..	..
Punjab	115	..	45	..
Delhi	..	..	..	..
U. P.	1,817	..	98	..
B. & O.	17,019	0·5	495	0·4
Bengal	26,974	0·6	2,268	0·6
C. P.	1,938	0·1	214	0·1
Bombay	7,312	0·4	485	0·1
Madras	3,285	0·1	566	0·1
Coorg	..	..	..	..
Assam	5,477	0·7	31	0·2
Burma	124	..	55	..
Ajmer-Merwara	..	..	..	..

The Director, Eastern Bureau of the League of Nations, Singapore, reported that, during 1933, only 4 ships were infected with cholera, the infection in all 4 having had its origin in a port of British India. In Calcutta, which was as usual infected throughout the year, the disease followed its customary course fairly closely, tending to rise in the latter half of March, reaching its maximum in the last week of April and subsiding in May and June. Chittagong recorded a much heavier incidence, mostly during April and May. In Madras, an epidemic occurred in December. Other ports reported sporadic cases only.

Details of cholera researches will be found in Section VIII on pages 188-189, 206 and 216.

(*b*) *Provincial.*

N.-W. F. P.—The province remained free.

Punjab.—The cholera incidence was one of the lowest ever recorded, attacks numbering only 288 and deaths 160. Infection was mainly imported, but only sporadic cases occurred from March to December in 20 districts, in which 11 towns and 70 villages were involved.

Delhi.—Only 2 non-fatal imported cases occurred in Delhi city.

U. P.—Infection was imported from Bengal and Nepal State and the outbreak, which was the mildest experienced in recent years, was chiefly confined to the rural districts of Gorakhpur and Basti, which recorded 759 and 727 deaths, respectively. In no other district did the deaths exceed 60. The highest mortality (1,059) was reported in May and the lowest in February (10).

B. & O.—Cholera existed in mild form for a part of the year in North Behar, especially the districts of Darbhanga, Champaran and Muzaffarpur and more or less throughout the year in the districts of Balasore and Cuttack, where the highest death rates were recorded. The districts in South Behar and Chota Nagpur remained comparatively free. Of the total deaths, 98 % were recorded in rural areas.

The maximum mortality occurred in October and the minimum in June.

Bengal.—The districts of Tippera, Dacca and Bakarganj on the south-east suffered most with 4,292, 4,565 and 3,566 deaths, respectively, these figures representing 42 % of the total mortality in the province. Compared with the decennial mean, the death rate was low in nearly every district. The peak mortality was recorded in April.

C. P.—1,943 deaths or 90 % of the total, were reported in the Berar division and of these 1,749 occurred in rural areas. In other divisions infection was sporadic or mild. In some districts, the disease was imported from fairs ; in others, the infection was due to the use of contaminated water, but in certain instances the source of the infection could not be traced. Most of the deaths occurred from August to December.

Bombay Presidency.—An epidemic of moderate severity prevailed almo throughout the year. The Central Registration district was worst affected, the incidence being much higher than in 1932 and the districts of Ahmednagar, Poona, Nasik, Thana and Kolaba all being badly affected. A fair held at Paithan was largely responsible for the spread of infection in Ahmednagar. The disease became serious from March, and the peak mortality was reached in July and August when 1,518 and 1,413 deaths were recorded. In the Southern Registration district, the infection was carried over from the preceding year, the districts of Sholapur (1,252) and Satara (1,025) recording the largest

numbers of deaths. The source of infection was variously traced to polluted water of *nalas* and rivers, to importation from the Nizam's Dominions and other places and to the Chaitri and Ashadi fairs. Almost all the 975 deaths recorded in the Northern Registration district occurred in the districts of East and West Khandesh ; Gujarat was practically free. In the former, infection was introduced from the Paithan fair in the Nizam's Dominions and caused 1,449 attacks and 525 deaths. In the latter, the outbreak was mainly water-borne. The Sind Registration district remained practically free, only 3 fatal cases being recorded.

Madras Presidency.—Cholera figures were the lowest recorded during the last 50 years. 3,751 deaths, or 97·% of the total, occurred during the latter half of the year. The epidemic was confined practically to the districts of Ganjam, East and West Godavari, Guntur, Kistna and North Arcot.

The D. P. H. summarises the course of the epidemic thus :

" After a period of comparative quiescence of nearly a year from July, 1932, to June, 1933, an epidemic of cholera broke out in Vasuntavada, a remote village in West Godavari district, about the first week of July, just before the onset of the Bezwada Pushkaram. Nearly simultaneously with this outbreak an epidemic was reported in the villages of the Kistna district contiguous with those infected in West Godavari and another among the fishermen in the almost inaccessible villages near the mouth of the river Godavari. In view of the imminence of the Pushkaram in August, 1933, very active preventive measures were adopted to keep the epidemic in check and, notwithstanding the opportunities for its spread, such as the numerous canals used as sources of water supply, easy communications, and the habits of the people, it was possible to limit the spread of the epidemic in the area outside the Pushkaram zone and to keep the Pushkaram zone free from infection. This outbreak came to an end in East Godavari and Kistna districts in September, but it smouldered in a mild sporadic form in West Godavari. This appears to have been responsible for a second outbreak towards the end of November, 1933. November and December being the harvest months, large numbers of coolies from Nellore, Guntur, Kistna and the Nizam's Dominions had migrated as usual in search of labour to the deltic areas in West Godavari district where they became victims of the infection. On the outbreak of cholera, they returned in panic to their homes and disseminated the disease with the result that an explosive outbreak occurred in Kistna, Guntur and Nellore districts which lasted for about two months ."

Assam.—This province was visited by an epidemic of virulent type which started in Cachar as a result of floods and spread down the Surma Valley, the rural districts of Cachar and Sylhet being chiefly affected. The death rate was only slightly over the figure for 1932, but as the epidemic was not widespread it kept below the decennial mean. In spite of intensive preventive measures, the epidemic persisted for some time. The seasonal peak occurred in October (964), November (1,992) and December (1,537) and then fell to a minimum in January. Rural areas alone accounted for 5,477 out of the total of 5,508 deaths. As rivers form the main source of water supply in the Surma Valley, the disease spread down along the Barak river to Sylhet district.

Burma.—This province was remarkably free as only 179 deaths were reported as compared with the yearly average of 4,851. Only in Mergui district did the disease prevail in mild epidemic form. The D. P. H. has referred to the decline of cholera during recent years in the following words :—

" Up to 1929 this disease took an annual toll in the province running into thousands. Since then, it has been far less prevalent and the very low figure for 1933 is extremely satisfactory. There is no doubt that the earlier detection of cases, immediate inoculation and other preventive measures, where an outbreak occurs, have played their part in preventing the disease from spreading."

(c) *Anti-cholera measures.*

Routine sanitary measures such as improvement of water supplies in villages and at *melas*, etc., improvement of conservancy, medical inspection at railway stations of pilgrims, and the employment of epidemic staffs were adopted in various centres as and when necessary.

Table II (*vi*) gives the numbers of anti-cholera inoculations performed during 1932 and 1933 in the different provinces.

TABLE II (*vi*).

	1932.	1933.
British India	**1,592,514**	**1,949,244**
N.-W. F. P.	11,065	..
Punjab	45,670	**30,077**
Delhi	..	**22**
U. P.	54,730	**26,629**
B. & O.	241,235	**20,000**
Bengal.	952,105	**1,036,643**
C. P.	31,014	**103,118**
Bombay	21,713	**110,639**
Madras	76,859	**174,786**
Coorg	..	..
Assam	108,052	**413,282**
Burma.	50,071	**34,029**
Ajmer-Merwara	..	**19**

Inoculation with the anti-cholera vaccine is now generally accepted in India as a preventive method of proved efficacy. Whilst in some few endemic areas a proportion of the population has reached the stage of asking for inoculation on the approach of the cholera season, unfortunately it is ordinarily resorted to only after an outbreak has occurred or when an epidemic threatens to break out. But even then it has its valued place in preventive campaigns and in most areas the people are willing to submit themselves to inoculation as they are well aware of the protection it confers. With the growth of district health organisations and especially where whole-time health officers are employed, it is now much more easy to bring this preventive method to the average villager and in the absence of other more permanent measures, anti-cholera inoculation will for long continue to be one of the most valuable weapons in the hands of public health staffs. Further records have been collected in order to demonstrate the varying incidence of the disease amongst inoculated and non-inoculated groups. In Burma, during an epidemic at Meiktila which has a population of 281,029, the following figures were recorded :—

	Number.	Rate.
Non-inoculated population	230,933	..
Attacks	954	4·1
Deaths	706	3·1
Inoculated population (only one dose given)	50,096	..
Attacks	38	0·8
Deaths	38	0·8

Restricting observation to a population of 55,011 in 152 *infected* villages in the same district the following results were reported :—

	No.	Attacks.	Rate.	Deaths.	Rate.
Un-inoculated . . .	22,561	954	42·3	706	31·3
Inoculated	32,450	38	1·2	38	1·2

These are very convincing figures and go to corroborate previous evidence on the same subject.

Cholera bacteriophage has been under experimentation in selected area in Assam, B. & O. and Madras Presidency. It has so far been found impossible to draw any definite conclusions as to the value of this phage for the very fortunate reason that low incidence of cholera throughout India and its entire absence in certain areas during the past 2-3 years has prohibited the carrying out of controlled experiments. This work is being continued.

Plague.

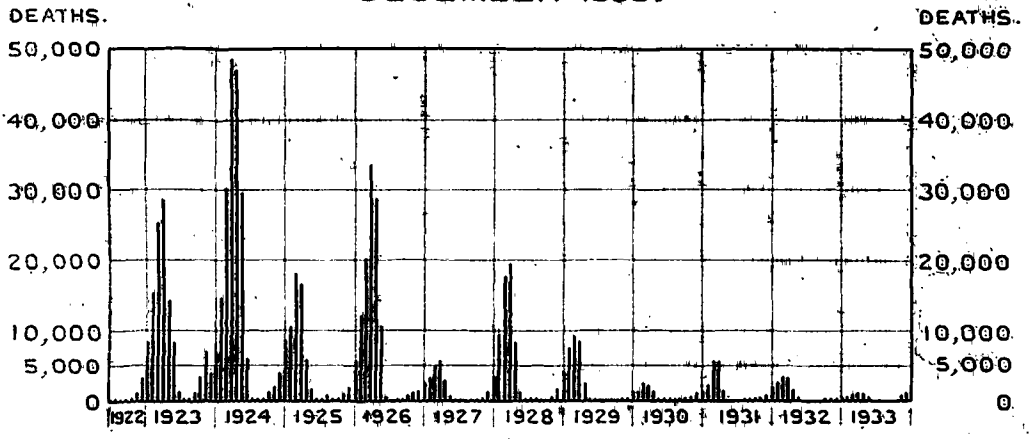
(*a*) *General.*

15. The upward trend in the mortality curve recorded in the preceding two years was not maintained, the total deaths in 1933 decreasing to 42,631. Chart No. 5 shows that the reduction in incidence was particularly marked in Northern India where plague has long been endemic. Provisional figures for the early months of 1934 indicate, however, that the comparative calm of the last 5 years in this endemic focus is likely to be disturbed by an outbreak of moderate intensity. During 1933, the most important plague focus in North-East India, which includes the foot hills of the Himalayas in the eastern U. P. and western Bihar, reported only mild or sporadic infection ; although in the upper Ganges Valley, infection was somewhat severe. In the Punjab, a mild epidemic continued to be reported in the sub-montane tracts. The increased mortality in the Peninsula and especially that in Bombay Presidency was the only real disquieting feature. In Bombay Presidency the epidemic curve after reaching its annual peak in December, 1932, declined steadily during the first 5 months of 1933, but thereafter took an upward trend reaching its maximum in October and the total plague deaths in this area were the highest since 1924. The most heavily infected districts were Bijapur, Belgaum, Dharwar, Satara and Sholapur in the Southern Registration District,—in which area the disease persists in endemic form,—and Poona in the Central Registration District. These areas accounted for over 97 % of the provincial total. The most noteworthy feature of plague during 1933 therefore was its continued persistence in its old hounts. In the C. P., although mortality was generally low, the districts of Chhindwara and Hoshangabad in the Machadeo Hills again suffered worst. In the Madras Presidency, Bellary district recorded 61 % of the provincial total. N.-W. F. P., Delhi and Ajmer-Merwara remained free as did the whole eastern seaboard of India, northern Burma, Assam, Bengal, the S. E. parts of B. & O. and the western areas of the Punjab and upper Sind. Map No. 3 which shows plague mortality by districts in British India and Indian States may be studied for further details.

Table II (*vii*) gives the numbers of deaths and rates *per mille* in British India and in individual provinces for the period 1929—33.

№ 5

PLAGUE DEATHS REPORTED IN NORTHERN INDIA,* BY FOUR-WEEK PERIODS, FROM JULY 1922 TO DECEMBER 1933.



* N.W.F.P., Punjab, Punjab States, U.P., B. & O. and Kashmir.

Note.—Reproduced from the League's Weekly Epidemiological Record dated 23rd August 1934. № 34. (R.H. 443.)

TABLE II (*vii*).

	1930.		1931.		1932.		1933.	
	Deaths.	Rate p. m.	Deaths.	Rate p. m.	Deaths.	Rate p. m.	Deaths.	Rate p. m.
British India	24,841	0·1	45,626	0·2	46,504	0·2	42,631	0·2
N.-W. F. P.	..	..	..	..	..	..	..	..
Punjab	554	..	1,150	..	2,003	0·1	1,789	0·1
Delhi	..	..	1	..	..	..	..	
U. P.	10,860	0·2	31,225	0·6	21,497	0·4	9,835	0·2
B. & O.	4,105	0·1	5,429	0·1	3,374	0·1	1,635	..
Bengal	..	..	1	..	1	..	1	..
C. P.	871	0·1	1,642	0·1	2,658	0·1	1,200	0·1
Bombay	5,026	0·3	3,506	0·2	14,446	0·7	24,560	0·1
Madras	1,459	..	1,073	..	1,561	..	2,591	0·1
Coorg	3	..	25	0·1	8	..	48	0·3
Assam	..	..	..	..	..	..	..	..
Burma	1,962	0·2	1,574	0·1	1,556	0·1	972	0·1
Ajmer-Merwara	1	..	..	..	..	..	..	..

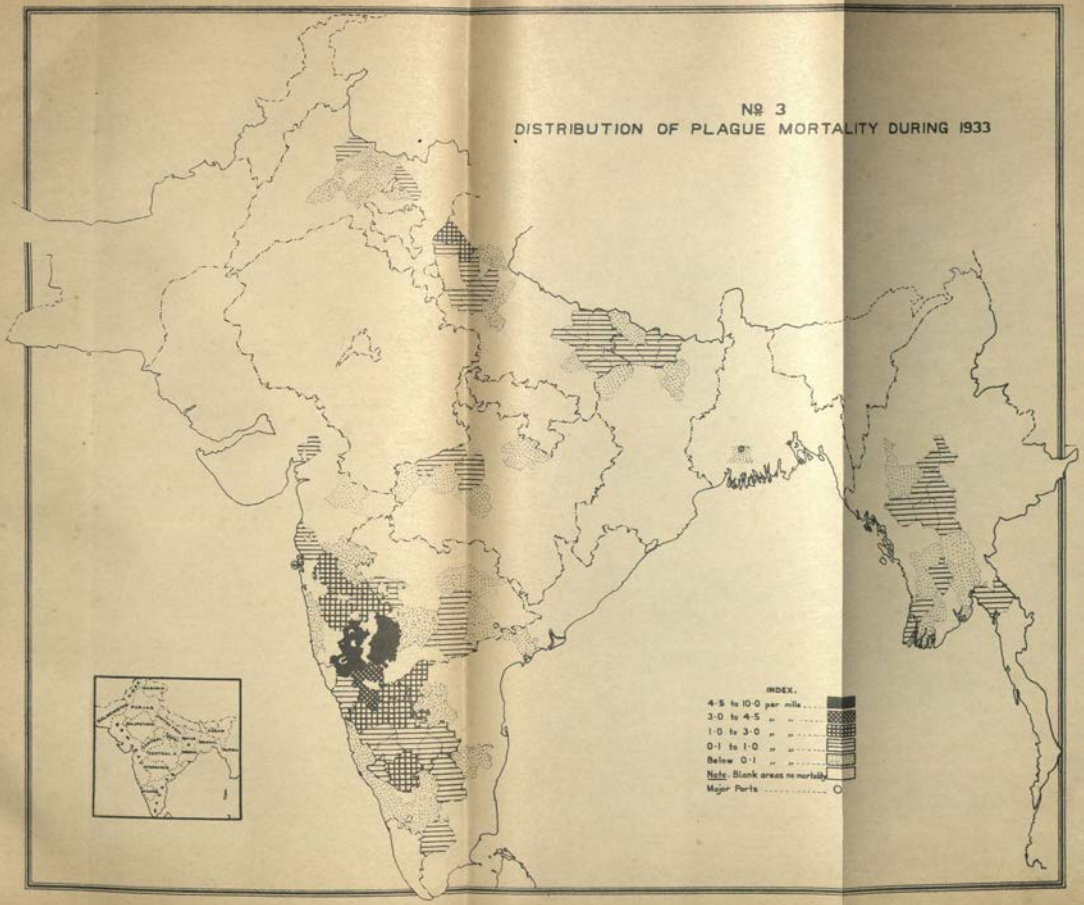
Recorded cases totalled 93,122, giving a case mortality rate for British India as a whole of over 46 per cent.

Table II (*viii*) gives details by quarters for the different provinces.

Owing to the fact that the centre of intensity of infection during 1933 was in the Deccan, the maximum mortality occurred in December and the minimum in June. Figures showing seasonal incidences for the different provinces are given in Appendix II (page 330).

TABLE II (*viii*).

	1st Quarter.		2nd Quarter.		3rd Quarter.		4th Quarter.		Total.	
	1932.	1933.	1932.	1933.	1932.	1933.	1932.	1933.	1932.	1933.
Total	29,026	20,955	7,742	7,688	10,399	25,740	20,199	38,739	67,366	93,122
Punjab, Delhi and Punjab States	1,209	364	1,774	1,990	..	26	168	724	3,151	3,104
Bengal	1	..	..	..	..	..	..	..	1	..
U. P.	8,315	1,807	2,973	1,496	2	97	181	1,854	11,471	5,254
B. & O.	2,195	708	158	75	4	32	68	180	2,425	995
C. P.	9,227	1,161	1,004	207	381	1,646	1,318	6,073	11,930	9,087
Bombay	3,329	8,238	870	1,693	5,557	11,013	11,097	15,023	20,853	35,967
Madras	801	1,302	286	213	943	2,373	1,242	1,889	3,272	5,777
Burma	1,451	475	114	107	50	246	196	463	1,811	1,291
Hyderabad State . . .	371	4,006	58	969	860	5,315	2,587	6,764	3,876	17,054
Mysore State	1,505	781	242	323	1,594	1,642	1,587	2,072	4,928	4,818
Bombay Presidency States .	482	1,656	243	522	997	3,213	1,519	3,403	3,241	8,794
Other Indian States . . .	140	457	20	93	11	137	236	294	407	981


№ 3
DISTRIBUTION OF PLAGUE MORTALITY DURING 1933
INDEX.
4·5 to 10·0 per mile
3·0 to 4·5 " "
1·0 to 3·0 " "
0·1 to 1·0 " "
Below 0·1 " "
Note. Blank areas no mortality
Major Ports

In regard to the forecast of probable incidence in India during 1933, Sir Leonard Rogers wrote :—

" *Central Provinces.*—The climatic factors were mostly normal with deficient saturation, deficiency favouring increased plague in one quarter.

Forecast.—Average to high plague in the August 1932 to May 1933 season, most in the eastern districts bordering on the north Deccan.

Bombay Deccan.—The 1932 hot weather temperatures and saturation deficiencies were low and favourable to subsequent high plague incidence.

Forecast.—Increased plague, especially in the north Deccan in the August 1932 to May 1933 season. (The last weekly returns show increased plague here.) "

Total deaths and death rates p. m. in rural and urban areas in each province for the years 1932 and 1933 are given in Table II (*ix*).

TABLE II (*ix*).

	Rural.				Urban.			
	1932.		1933.		1932.		1933.	
	Deaths.	Rate p. m.	Deaths.	Rate p. m.	Deaths.	Rate p. m.	Deaths.	Rate p. m.
British India	41,537	0·2	38,448	0·2	4,967	0·2	4,183	0·2
N.-W. F. P.	..	..	..	..	..	..	..	..
Punjab	1,871	0·1	1,680	0·1	132	..	109	..
Delhi	..	..	..	..	..	..	..	..
U. P.	20,384	0·5	9,299	0·2	1,113	0·3	536	..
B. & O.	3,368	0·1	1,617	..	6	..	18	..
Bengal	..	..	..	..	1	..	1	..
C. P.	1,662	0·1	1,029	0·1	396	0·2	171	0·1
Bombay	12,938	0·7	22,051	0·2	1,508	0·3	2,509	0·6
Madras	881	..	2,284	0·1	680	0·1	367	..
Coorg	8	..	14	0·1	..	..	34	3·5
Assam	..	..	..	..	..	..	..	..
Burma	425	..	474	..	1,131	0·8	498	0·3
Ajmer-Merwara	..	..	..	..	..	..	..	..

Research.—This has been reviewed on pages 198-199 and 215.

(*b*) *Provincial.*

N.-W. F. P.—Remained free for the sixth year in succession.

Punjab.—The epidemic was comparatively mild and the recorded death rate 0·07 p. m. was only about half that of the quinquennial mean. Of the 8 districts infected, those of Hoshiarpur and Gujrat were responsible for 87 % of the total deaths ; in the remaining districts the numbers varied between 1 and 84. The Ambala and Multan divisions remained free. In the Rawalpindi division, only Gujrat was infected. Calculated on the basis of the population involved, the disease was more severe in the rural than

in the urban areas. The disease was mainly of the bubonic type but a few cases of pneumonic and septicaemic types also occurred. The D. P. H. summarises the epidemiology of the disease in his annual report as follows :—

"As a result of the recrudescence of the disease in the autumn of 1932, two distinct foci (Hoshiarpur and Gurdaspur) were recognisable in the month of January in the submontane tract of the Himalayas. The disease remained well under control during the month of February with the exception that one more district (Gujrat) was involved. In March the infection began to increase and the plague curve showed a marked rise in the month of April when no less than 400 deaths were recorded. The epidemic reached its acme during the month of May, returning as many as 785 deaths, after which there was a sudden decline in June (115 deaths) followed by July with 12 deaths only. The Province was declared free of infection during the month of August but the disease recrudesced in September and continued to increase till the end of the year."

Delhi.—Except for one non-fatal case in Delhi city imported from Bijnor the province remained free.

U. P.—Plague mortality was the lowest since 1924, the rate being only one-fourth of the quinquennial average. The incidence was high up to the end of May ; thereafter it dropped to 46 deaths in July, but rose again in October and November reaching the peak in December with 2,386 deaths.

Rural death rates were 50 % higher than urban ; 139 females died for every 100 males.

B. & O.—Plague is endemic in certain isolated tracts in the districts of Saran, Champaran, Muzzaffarpur and Darbhanga in the Tirhut division and North Monghyr in Bhagalpur division and with the approach of the winter season appears regularly in these areas, reaching a maximum intensity during February and March and subsiding again with the advent of the hot weather. During 1933, the death rate again decreased and was only one-fifth of the decennial mean. Nearly the whole mortality was registered in the 5 districts mentioned above. For every 100 deaths among males, 161 were registered among females.

Bengal.—Only 1 death occurred in Calcutta in December.

C. P.—The death rate was only about half the rate for 1932 and the quinquennial mean. The disease was confined to the Nagpur and Jubbulpore divisions, the Chhattisgarh and Berar divisions remaining free except for 5 deaths in the latter. In Chhindwara district alone, with 274 infected villages, was the disease widespread ; in Hoshangabad 140 villages were infected.

Bombay Presidency.—In contradistinction to many other areas, this province experienced a severe outbreak of plague, which caused 24,560 deaths. This is the worst epidemic since 1923. The heaviest mortality occurred in the Southern Registration district, where district death rates varied between 10 and 0·4 p. m. In this area the epidemic curve of 1932 after reaching its maximum in December showed a steady decrease during the first 5 months of 1933, but again rose reaching its maximum in October. As in the previous year, the Sind Registration district remained entirely free ; in other Registration districts infection was mild.

Madras Presidency.—Increased mortality was recorded particularly in the latter half of the year. The epidemic was severe in Bellary district, where 1,571 deaths occurred, and to a lesser extent in the districts of Madura, Salem and Coimbatore. Other districts were free or reported only sporadic infection.

Assam.—As usual remained free.

Burma.—Plague is generally a disease of the cold weather in this province and during 1933 the highest mortality was recorded in January, February, March and December. The total of 972 deaths compares very favourably with the 20-year average of 4,826 ; in fact the death rate of 0·08 p. m. was the lowest recorded since the introduction of the disease in 1905. Most of the deaths were recorded in the districts of Magwe (166), Mandalay (149) and Meiktila (103). The disease is endemic in Meiktila district and has been constantly present there since 1910 with the exception of one year. In Magwe the infection was introduced by travelling *bazar* sellers from Kyaukpadaung. As usual, the Arakan division and the districts of Tavoy and Mergui remained free ; the districts of Hanthawaddy, Pyapon, Amherst, Thayetmyo, Kyaukse, Shwebo and Lower Chindwin also reported no deaths. The urban rate of 0·4 p.m. which is also the lowest on record, was less than half that of 1932 and only one third of the five year mean.

(*c*) *Anti-plague measures.*

Inoculation.—Table II (x) gives the numbers of anti-plague inoculations performed in the various provinces.

TABLE II (*x*).

	1931.	1932.	1933.
Punjab	62,468	91,600	133,747
U. P.	147,986	107,351	99,983
B. & O.	67,940	..	25,154
C. P.	28,526	41,902	51,500
Bombay	74,288	246,146	559,723
Madras	50,768	84,742	129,191
Coorg	11,595	..	15,961
Burma	71,946	56,015	70,924

Rat destruction :—*Punjab.*—Intensive rat destruction was carried out during the off-season in all potential epidemic foci and the villages in the immediate neighbourhood. In addition to *bhoosa battis*, cyanogas dust was extensively employed for the destruction of rats.

Delhi.—Systematic rat killing was continued both in rural and urban areas especially in grain markets, and 367,826 and 307,310 rats respectively were destroyed in these areas. Expenditure in rural areas totalled Rs. 13,610 ; that in urban areas Rs. 24,176.

U. P.—The staff of travelling dispensaries performed 49,072 inoculations, the district health staffs 30,499 and other agencies 20,412. The death rate among the inoculated was 0·75 p. m. ; that among the uninoculated 1·98 p.m. Rat destruction was carried out by a few local boards.

C. P.—Inoculations performed by the public health staff totalled 24,144 ; those by medical staffs 24,278 ; and those by private practitioners 3,078. As in previous years, temporary plague regulations under the Epidemic Diseases Act were put into force in 3 districts and 14 towns. Rat destruction continued to be confined to certain urban areas.

Bombay Presidency.—559,723 inoculations were performed in British territory and 97,742 in Indian States ; most were done in the Southern Registration district where the incidence of plague was severe.

Table II (xi) gives details of the rats killed together with the plague deaths recorded each month in Bombay City.

TABLE II (*xi*).

	Examined.	Infected.	Per cent infected.	Human deaths.
Total	255,099	394	0·15	48
January	24,263	23	0·09	..
February	26,741	57	0·21	3
March	27,043	126	0·47	12
April	18,859	114	0·60	11
May	23,189	35	0·16	6
June	18,816	18	0·10	2
July	17,704	5	0·03	1
August	19,591	3	0·02	2
September	18,676	3	0·02	6
October	18,754	3	0·02	3
November	22,582	6	0·03	1
December	18,881	1	0·00	1

Madras Presidency.—The chief preventive measures included inoculation evacuation, cyanogas fumigation of rat-burrows and sun-disinfection of grain wherever weather and other conditions permitted. (See p. 47 for details of cyanogas experiments.)

Burma.—A total of 724,165 rats were killed, including 667,798 in Rangoon. Except in the Hlegu Health Unit area in the Shan States and in Magwe, no rat killing was carried out in rural areas. Steps were being taken to train sub-assistant surgeons and public health inspectors in the use of cyanogas for fumigating rat burrows. 42,073 inoculations were performed in rural and 28,851 in urban areas. Other preventive measures included general cleansing of houses and streets, disinfection, segregation and evacuation.

Whilst trapping and poisoning of rats should play a useful part in a well-organised preventive campaign against plague, these measures have less influence on the infected rat-flea which in the long run is the most important factor in spreading the disease to man. During recent years more and more attention has been paid to the life history of rat-fleas and to the epidemiological features which favour their breeding ; an obvious corollary to investigations in those directions is experimentation devised to discover the most suitable methods for destruction of these insects by disinfestation of rat burrows which afford the main harbourage both for rats and fleas. With this end in view, experiments have been carried out in several centres during the past year or two with various preparations which contain a considerable proportion of HCN. Generally, the results obtained have been very encouraging and it appears likely that by means of one or other of the HCN products now on the market, the development of plague can be largely controlled, provided suitable apparatus and methods are adopted. A brief summary of the experiments carried out in Madras, Bombay, the Punjab and Burma is here recorded ; this should be of direct interest to public health officers who have to deal with plague infected areas.

Madras-Cumbum Valley.—Epidemic plague has been in existence in Cumbum village from 1926 onwards. In March, 1932, an attempt was made to fumigate every rat burrow in every house of this village, no less than 11,948 burrows in 2,210 houses out of a total of 3,334 being treated. While the burrows were being inspected prior to fumigation, dead rats were occasionally found and a few of these showed signs of plague infection. The 1932 outbreak in and around the Cumbum Valley was fairly severe, a total of 2,014 cases and 701 deaths being recorded. 87 cases of human plague occurred in the village itself in the latter half of 1931, 30 in January, 9 in February and 4 in March 1932, when fumigation was begun. No further plague occurred until January 1933 (3 cases) and February (7 cases) and none thereafter until February 1934. Every attempt was made to obtain the earliest information of rat falls or human plague and as soon as a plague infected rat was discovered, the house concerned and the adjacent houses were again fumigated. In all 110,000 burrows were treated and whilst the number of animals dying inside the burrows could not be ascertained, 3,150 dead rats were found outside the burrows and, in addition, 1,156 mice, 232 bandicoots, 11 field rats, 9 musk rats and numbers of snakes, frogs and lizards were picked up dead. In six localities, fumigation was carried out after rat falls were discovered and no further rat falls and no human plague cases were detected. Twenty localities were fumigated at times when human cases were occurring there almost daily and the outbreaks appeared to be checked. Four localities which were fumigated towards the end of the 1932 epidemic remained entirely free during 1933 and a further 6 localities were apparently protected from plague by fumigations carried out after neighbouring villages were heavily infected. In only 2 villages were the results disappointing. The work done in this area appears to furnish strongly suggestive evidence that fumigation with cyanogas is of considerable value in the prevention of plague. Further experiments carried out during 1934-35 have shown that where fumigation is carried out sufficiently early, the epizootic is promptly aborted. Villages which were fumigated when infection threatened either completely escaped or the onset of the outbreak was considerably delayed. During this period a further 184,000 rat burrows were treated in and around 16,000 houses in 25 different localities and thousands of rats, mice and bandicoots were killed.

In view of these encouraging results, the use of cyanogas was extended to the plague infected villages of Bellary district and with a grant from Government towards the cost of pumps and cyanogas powder, fumigation of rat burrows during the plague off-season was proposed. As a result of the field researches in this direction, a revised memorandum on plague preventive policy has been prepared and submitted to the Madras Government for their approval. This memorandum includes a note on the technique of cyanogas fumigation and the precautions to be adopted.

Bombay Presidency.—Preliminary experiments were carried out at the Haffkine Institute by Lt.-Col. S. S. Sokhey, I.M.S., in artificial 16 ft. long zig-zig burrows covered with plate glass sealed down with mud. Rats in perforated metal cylinders and fleas in muslin bags were placed at different points in the burrows and free rats were also introduced ; cyanogas dust was then pumped in. This experiment, repeated several times, showed that rats and fleas up to a distance of 16 feet were invariably killed. Table II (*xii*) gives details of a series of experiments carried out to test the relative value of cyanogas dust "A" and calcid.

TABLE II (*xii*).

A.—*Cyanogas "A" Dust.*

Tests.— No. of Experiment.—3rd Series.	Amount of dust used.	Duration of exposure before breathing apparently stopped. (Minutes.)	Deaths. Rats.	Deaths. Fleas.
1	64 g.	2·5	6/6*	15/15*
2	38 g.	5·0	4/6	13/15
3	42 g.	10·0	6/6	15/15
4	26 g.	20·0	2/6	11/15
5	35 g.	20·0	4/6	12/15
6	17 g.	..	2/6	13/15

B.—*Calcid Briquettes.*

No. of experiments— 1st Series.	Amount of dust.	Duration of exposure before breathing apparently stopped. Minutes.	Deaths. Rats.	Deaths. Fleas.
1	17 g.	2	6/6†	15/15†
2	8 g.	3½	6/6	15/15
3	4 g.	6	6/6	15/15
4	2 g.	9	6/6	13/15
5	1 g.	9	6/6	14/15
6	0·5 g.	30	6/6	6/15

Similar experiments in natural burrows found in a dilapidated roofless house in Poona city indicated that 96 % of the rats present were killed. Encouraged by these results, Bijapur town, where plague had only been absent one year since 1924, was selected for a trial. Out of 2,400 lbs. of the dust supplied to the municipality, 1,644 lbs. were actually used. The freedom of the town in 1934 was attributed to the use of cyanogas dust but, to confirm the results, it is proposed to extend the operations to a selected group of villages. In one house in Bijapur town, all rats and fleas were destroyed, not only in the three rooms directly fumigated but those in the fourth room having free communication with one of these rooms. In another room, which was shut off from the fumigated rooms by a small door, about half of the rats escaped and 10 dead rats and a dead lizard were found to have fallen from the roof. In another part of the same town, where grain godowns are situated, 503 houses, containing 2,233 rat burrows were fumigated and here even the rats and snakes that left the burrows died after a short time.

* Were left in the burrow for 20 hours.

† The lower figures give the total number of animals used and the upper figures give the number of deaths.

In addition, 5,300 lbs. of cyanogas dust were supplied to 16 other local bodies in British districts and Indian States, but the results obtained are not yet known.

Punjab.—With a view to the adoption of cyanogas for the destruction of rats and fleas in infected areas in lieu of, or as an auxiliary to *bhoosa-battis*, preliminary experiments were conducted with cyanogas dust "A" both in artificial and natural rat holes in the fields as well as in houses. It was found that the minimum period of exposure to the gas required was 2 minutes. The following conclusions were recorded :—

(i) Experiments carried out with *bhoosa-battis* in the Punjab Epidemiological Bureau in 1926 indicated that the lethal range of the smoke did not extend beyond 10 ft. for the rats and 5 ft. for the rat fleas. On the other hand, with cyanogas the range of destruction for both rats and rat fleas has been found to extend to a distance of 15 ft. from the mouth of the rat hole.

(ii) About one in eight of the *bhoosa-battis* were extinguished soon after the rat holes were closed with mud and consequently failed to destroy the inmates. There is no such difficulty in the case of cyanogas.

(iii) *Bhoosa-battis* are harmless to human beings but cyanogas with a low diffusive power should not be a source of danger if it is handled by a competent staff. Moreover if doors are left open, only a small concentration of the gas is retained in the air of the room and within 2 hours after the house is opened up only slight traces of the gas are left.

Burma.—Fumigation with cyanogas was begun in October, 1934, and so far outfits have been obtained by 37 municipalities, 19 district councils and 7 other institutions and 1,265 lbs. of the fumigant have been purchased. It is not possible to give definite results as yet but the degree of success has apparently varied in different localities. In the town of Mandalay, this new method of killing rats and their fleas has been a pronounced success, plague deaths having totalled only 14 during the last plague season as against an average mortality of 739.

Smallpox.

(*a*) *General.*

16. During 1933, over a quarter of million cases of smallpox were recorded with nearly 104,000 deaths. These figures are the highest for several years past and, considered apart from the influence of preventive measures, indicate that like the other great epidemic diseases of India smallpox continues to adhere to a long-wave cycle which has a fairly regular periodicity. In B. & O. which had severe epidemics during 1925-27, the present cyclic increase was anticipated a year in advance and the D. P. H. explains the increased mortality in the following words :—

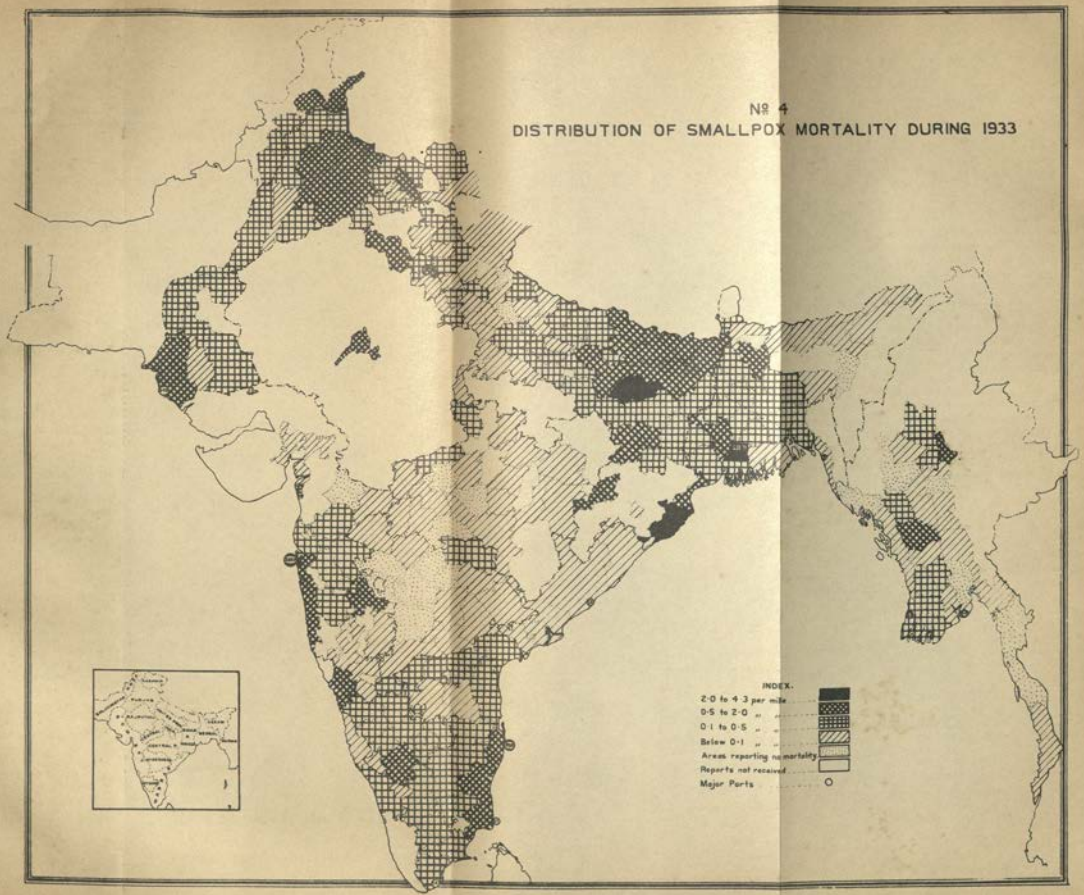
"It is a known fact that vaccination prevents and limits outbreaks of smallpox, but still the rate of mortality from this cause tends to show sharp rises at times in this province. This is due to the fact that a large number of children escape even primary vaccination and thus remain unprotected. Besides, the immunity conferred by vaccination gradually declines with the passage of time, with the result that protection passes off within 6 to 7 years."

This explanation seems applicable to other parts of India as the 1933 epidemic was widespread and of the total recorded deaths, 16,936, or over 16 % occurred amongst infants and 27,390, or over 26 % amongst children between 1 and 10 years. But there were exceptions and it is probable that these areas which escaped during 1933 will record epidemic outbreaks during 1934 and 1935.

With the exceptions of the C. P. and the two outlying provinces of Assam and Burma, every province reported a higher incidence and in Delhi, B. & O. and Ajmer-Merwara the increases were marked. In Delhi province, over 90 % of the smallpox deaths occurred among children under 10 years of age which fact certainly reveals defects in revaccination work ; probably the same may be said of Ajmer-Merwara. The N.-W. F. P. and Punjab were less severely infected but in the former the death rate was 7 times the quinquennial mean and in the latter it was nearly double that mean. The Presidencies of Madras and Bengal each recorded twice the number of deaths registered during the previous year and Bombay Presidency had almost three times as many as in 1932. These are decidedly disquieting figures, even taking into account the cyclic periodicity of the disease and it is to be hoped they have acted as a spur to the health departments concerned in their preventive efforts. They should also have provided due warning to provinces like the C. P. and Assam which have so far escaped from the present epidemic, for the portents are that these areas will later suffer unless active steps have been taken to push both vaccinations and revaccinations.

It may be of advantage to individual health officers and others to note here some of the more apparent factors which go to discount preventive campaigns against smallpox in this country. Even where notification is compulsory it is not properly enforced ; the loss of time involved inevitably postpones adoption of preventive measures which require prompt application if isolated outbreaks are not to assume epidemic proportions. On the other hand, where early notification has been made, outbreaks have been quickly and successfully controlled. Again, large numbers of children remain unprotected because of defective registration of births and because in nearly all rural areas and even in many urban areas vaccination has not been made compulsory. The first of these handicaps has been reduced considerably during recent years and it is to be hoped will soon disappear. The second is a matter which should be the concern of every officer engaged in public health work and can only be removed by patient and continued educational activities. Again, revaccination is not compulsory except in a few centres and as a result many individuals are never vaccinated after infancy. The acceptance of this preventive measure can only be achieved by propaganda suited to the populations which it is meant to influence. Lastly, isolation of smallpox cases is hardly ever practised because there are few infectious diseases hospitals in existence and because, even if there were, existing legislation is very defective and public opinion is non-existent as to the desirability of isolation. These are all severe handicaps to those engaged in the campaign against smallpox, but all are capable of reduction if the health officers concerned constantly keep them in mind and use every available opportunity to rouse the public conscience. It may be admitted at once that this task is a difficult one : it is however not impossible as the progress already made in certain provinces during the past decade has shown.

Table II (*xiii*) gives the total smallpox deaths, death rates and rates of successful vaccination per 1,000 of the population for British India and the


№ 4
DISTRIBUTION OF SMALLPOX MORTALITY DURING 1933
INDEX.
2·0 to 4·3 per mile
0·5 to 2·0 ,,
0·1 to 0·5 ,,
Below 0·1 ,,
Areas reporting no mortality
Reports not received
Major Ports

individual provinces. In few parts of India can it be said that the rates of successful vaccination are satisfactorily high; on the contrary, many are disappointingly low and will have to be largely increased before smallpox epidemics can be successfully prevented.

TABLE II (*xiii*).

	Deaths.		Death rate p. m.			Rate of successful vaccinations per 1,000 of population.	
	1932.	1933.	1932.	1933.	Mean 1928-32.	1933-34.	1932-33.
British India	**44,925**	**103,641**	**0·2**	**0·4**	**0·3**	**51·5**	**51·3**
N.-W. F. P.	513	1,532	0·2	0·7	0·1	86	76
Punjab	5,184	11,626	0·2	0·5	0·3	91	101
Delhi	183	948	0·3	1·4	0·6	42	117
U. P.	2,779	9,844	..	0·2	0·1	32	30
B. & O.	16,466	42,674	0·4	1·1	0·3	37	34
Bengal	7,910	15,426	0·2	0·3	0·4	80	81
C. P.	574	561	..	..	0·2	37	34
Bombay	2,699	7,741	0·1	0·4	0·4	34	35
Madras	5,363	10,745	0·1	0·2	0·2	45	39
Coorg	1	14	..	0·1	0·1	69	67
Assam	631	247	0·1	..	0·3	55	54
Burma	2,484	1,506	0·2	0·1	0·1	54	54
Ajmer-Merwara	138	777	0·2	1·4	0·8	44	40

Case mortality again reached a high figure, being over 41 % during the year. This can be seen by referring to Tables II (*xiii*) and II (*xv*). Table II (*xiv*) shows the relative position of India *vis-a-vis* certain other countries.

TABLE II (*xiv*).

	1926.	1927.	1928.	1929.	1930.	1931.	1932.	1933.
British India	**219,158**	**221,556**	**163,675**	**148,068**	**231,386**	**88,380**	**114,691**	**249,606**
England and Wales	10,146	14,767	12,420	10,968	11,839	5,664	2,039	631
Scotland	1	154	146	23	14	..	..	..
New Zealand	..	..	..	..	..	..	..	..
France	554	410	153	84	217	102	134	117
Germany	7	4	2	2	2	..	3	..
Italy	112	60	52	6	..	..	..	5
Norway	..	2	..	..	..	..	1	..
Sweden	1	..	..	..	1	..	10	..
Switzerland	54	..	1	..	1	..	2	..
Egypt	2,676	240	20	26	14	10	609	5,697
Netherland E. Indies	843	297	146	725	408	176	251	109
Ceylon	65	27	18	8	41	9	106	349
Japan	1,256	352	723	114	7	23	305	376
Siam	1,113	418	125	405	56	33	20	50
United States of America	33,392	37,600	39,396	42,282	48,907	30,151	11,194	6,233

Map No. 4 shows the geographical distribution of smallpox mortality in India during 1933 and Chart No. 6 demonstrates the periodicity of the disease during the last 4 years. The peak of the mortality curve during 1933 occurred in April and May; the minimum in October and November. The seasonal incidence in each province is given in Table F, Appendix II, page 331. Reported cases during each quarter of the year are detailed in Table II (*xv*).

TABLE II (*xv*).

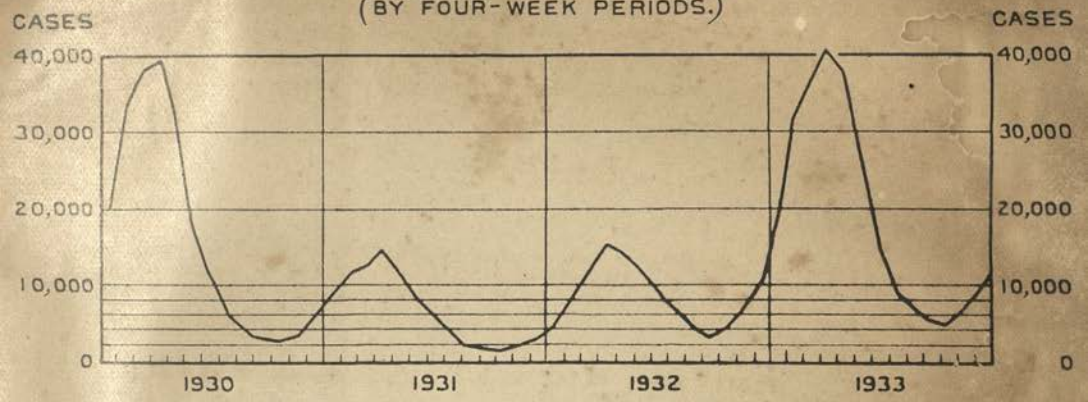
	1st Quarter.		2nd Quarter.		3rd Quarter.		4th Quarter.	
	1932.	1933.	1932.	1933.	1932.	1933.	1932.	1933.
Total .	**29,532**	**95,948**	**43,264**	**105,074**	**19,205**	**26,568**	**22,690**	**22,016**
N.-W. F. P. .	96	**1,095**	134	**1,159**	136	**468**	466	**539**
Kashmir .	..	**87**	..	..	..	..	16	..
Punjab . .	1,750	**12,291**	3,723	**6,858**	1,334	**1,477**	5,648	**598**
Punjab States .	15	**109**	36	**266**	9	**36**	17	**20**
Delhi . .	23	**3,855**	33	**519**	4	**14**	619	..
U. P. . .	844	**4,089**	1,324	**6,168**	345	**651**	213	**746**
B. & O. . .	6,917	**27,311**	15,825	**43,576**	5,338	**7,147**	5,696	**5,273**
Bengal . .	3,603	**12,600**	4,418	**13,329**	930	**1,901**	1,595	**1,800**
Bengal States .	110	**98**	270	**46**	143	**100**	59	**50**
Madras . .	4,633	**12,485**	3,411	**10,080**	5,564	**8,605**	4,689	**7,778**
Hyderabad .	558	**1,947**	459	**1,310**	332	**683**	111	**567**
Mysore . .	316	**415**	370	**838**	491	**219**	115	**156**
Bombay . .	3,091	**11,716**	4,783	**11,074**	1,931	**3,006**	1,676	**2,481**
Bombay States	147	**263**	98	**1,023**	41	**442**	10	**211**
Assam . .	75	**190**	294	**247**	63	**61**	169	**19**
Burma . .	3,702	**4,136**	5,348	**3,740**	1,224	**610**	556	**379**
Other Indian States.	2,795	**2,296**	1,355	**2,294**	776	**514**	591	**453**
Ajmer-Merwara	..	**65**	4	**452**	11	**43**	1	**8**
C. P. . .	845	**567**	1,341	**1,170**	515	**379**	157	**333**
C. I. Agency .	12	**333**	38	**925**	18	**212**	31	**605**

Table II (*xvi*) gives the recorded deaths among children under 10 years of age. This table fully corroborates what has already been said in regard to the prevailing low degree of protection among the general population and particularly among children under 10 years of age.

№ 6

CASES REPORTED DURING THE YEARS 1930 – 1933

(BY FOUR-WEEK PERIODS.)



NOTE.- Reproduced from the League's Monthly Epidemiological Report for July-August 1934. R.E.174.

TABLE II (*xvi*).

	Deaths.		% of total smallpox deaths.		
	Under 1 year.	1—10 years.	Under 1 year.	1—10 years.	Total.
British India . .	16,936	27,390	16	26	43
N.-W. F. P. . .	421	831	28	54	82
Punjab . . .	3,534	5,332	30	46	76
Delhi . . .	298	557	31	59	90
U. P. . . .	2,016	4,072	21	41	62
B. & O. . .	4,579	8,528	11	20	31
Bengal . . .	808	915	5	6	11
C. P. . . .	220	337	39	60	99
Bombay . .	1,807	3,306	23	43	66
Madras . . .	3,081	3,009	29	28	57
Coorg . . .	1	2	7	14	22
Assam . . .	24	31	10	13	22
Burma . . .	147	470	10	31	41

As usual, urban dwellers generally were more severely affected than the rural population. Table II (*xvii*) compares the death rates in rural and urban areas in the different provinces during the years 1932 and 1933.

TABLE II (*xvii*).

	Rural.				Urban.			
	1932		1933		1932		1933	
	Deaths.	Rate p.m.	Deaths.	Rate p.m.	Deaths.	Rate p.m.	Deaths.	Rate p.m.
British India .	36,612	0·1	82,104	0·3	8,313	0·3	21,537	0·8
N.-W. F. P. .	355	0·2	1,283	0·6	158	0·5	249	0·8
Punjab . .	3,276	0·2	9,980	0·5	1,908	0·6	1,646	0·5
Delhi . .	11	..	85	0·4	172	0·4	863	1·9
U. P. . .	2,302	0·1	7,450	0·2	477	0·1	2,394	0·6
B. & O. . .	15,825	0·4	40,232	1·1	641	0·4	2,442	1·7
Bengal . .	6,716	0·1	9,928	0·2	1,194	0·3	5,498	1·5
C. P. . .	453	..	446	..	121	0·1	115	0·1
Bombay . .	2,078	0·1	3,807	0·2	621	0·1	3,934	0·9
Madras . .	3,761	0·1	7,206	0·2	1,602	0·2	3,539	0·6
Coorg . .	..	..	14	0·1	1	0·1	..	..
Assam . .	625	0·1	234	..	6	..	13	0·1
Burma . .	1,106	0·1	1,116	0·1	1,378	1·0	390	0·3
Ajmer-Merwara	104	0·3	323	0·8	34	0·2	454	2·5

(b) Provincial.

N.-W. F. P.—A severe epidemic occurred, 3,288 cases with 1,532 deaths being recorded in the settled districts. The disease was particularly severe in Hazara and Peshawar and the death rates in these two districts were more than four times the quinquennial mean. In addition, 76 cases with 15 deaths occurred in the Kurram Agency; 106 and 35 in Malakand; and 205 and 79 in North Waziristan. The maximum mortality occurred in January when 213 deaths were recorded.

Punjab.—The increased incidence registered towards the close of 1932 was considered to be a manifestation of the periodic wave of infection to which the province seems to be liable every five years or so. It reached its maximum in January, 1933, when the deaths totalled 1,806. There was a slight fall in February with 1,648 deaths, but in March the figure again rose to 1,733. April recorded 1,625 deaths and May 1,757, after which the epidemic declined to 1,438 deaths in June, 866 in July, 329 in August, 142 in September, 66 in October, 72 in November and 144 in December. Compared with 1932, the incidence at the end of 1933 was much lower. Every district was infected and the outbreak was particularly severe in the rural districts of Shahpur, Sheikhupura, Gujranwala, Lahore and Jhelum.

Delhi.—Out of a total of 4,385 cases and 948 deaths recorded in this small province 3,681 and 808 respectively were reported in Delhi city. The epidemic was one which started towards the close of 1932 and 84 % of the total deaths occurred from January to March. 764 cases with 298 deaths occurred among children under 1 year; 2,112 and 422 among those between 1—5 years; 820 and 135 among those between 5—10 years; and 689 and 93 among those above 10 years. The fact that over 84 % of the cases and 90 % of the deaths occurred among children under 10 years of age indicates very clearly that the protection state of the child population of Delhi leaves much to be desired.

United Provinces.—Although the number of smallpox deaths recorded by the ordinary agency was 9,844, the data furnished by the verification agency has suggested the much lower figure of 2,713.

Bihar and Orissa.—The usual quinquennial rise in the morbidity and mortality curves which occurred in 1932 was continued into 1933 and the death rate for the latter year was thrice the decennial mean both in rural and urban areas. The infection was widespread in the districts of Gaya, Puri and Cuttack and nearly 50 % of the total mortality occurred in these districts.

Bengal.—The epidemic began in December, 1932, reached its peak in April, 1933, and declined steadily from May reaching the minimum in November but rising again in December. The monthly death rates were with one exception higher than those of 1932, but lower than the decennial mean. In the districts of Howrah, Hooghly, Burdwan and Rangpur, where the death rates were higher than the provincial average, the epidemic was relatively less severe. The great increase in the total urban death rate was due to a very severe epidemic in Calcutta where a total of 4,181 deaths was recorded and where the smallpox death rate was twice that of 1932 and more than three times the decennial mean.

Central Provinces.—The incidence in this province was mild, the death rate being only one-fourth of the quinquennial mean. In the Jubbulpore division in which most of the deaths occurred, 122 were among children under 1 year and 221 among those between 1—10 years.

Bombay Presidency.—Although an increased mortality was recorded as compared with 1932, this was still well below the quinquennial mean. The epidemic was severe in Bombay city where 2,657 deaths, giving a death rate of 0·7 p. m., were recorded. The highest district death rate, *viz.*, 2 p. m. was recorded in Kanara. The maximum mortality occurred in February and March with 1,437 and 1,584 deaths, respectively. The fact that 43 % of the total deaths occurred among children between 1—10 years indicates the necessity for a more vigorous vaccination campaign.

Madrás Presidency.—This province experienced a more widespread epidemic than any during the last 6 years and total deaths numbered 10,745 as against 5,363 in 1932 and 7,075, the quinquennial mean. Although, as the Public Health Department forecast, the mortality was high, the epidemic was not so severe as those experienced during the decennium 1914—23 which preceded the reorganisation of the health department. For example, the total smallpox deaths during 1914—23 numbered 279,996 whilst the total deaths during the period 1924—33 were 104,145. During the period 1924—33, the percentage of deaths of children under one year has fallen ; that of deaths among persons above ten years has risen from about 25 % to 40 % ; whilst the figures of deaths among children between 1—10 years do not show any very definite change. This emphasises the necessity for revaccination, in order to ensure protection of older children and adults.

Assam.—The fall in the mortality to 247 deaths during 1933 was ascribed to prompt preventive measures and to the thoroughness of vaccination. The death rate of 0·03 p.m. bears a remarkable contrast to the decennial average of 0·4 p. m. Of the total, 204 deaths occurred in the Assam Valley.

Burma.—Although infection was widespread, involving 27 districts, the total incidence was lower than in 1932. Nearly 10 % of the deaths occurred among children under 1 year and 31 % among those aged 1—10 years. Many cases over 10 years of age had not been revaccinated since childhood. The D. P. H. reports that " In practically every case the disease got a foothold as a result of failure to report the occurrence of early cases and until the law regarding notification is strictly enforced, early preventive measures will be difficult to carry out ".

The urban death rate was nearly thrice that in rural areas. Among rural districts, Mandalay, Thayetmyo, Shwebo and Myaungmya were severely infected and in the first two the epidemic was with one exception the worst since 1920. In regard to Myaungmya, the D. P. H. remarks that " a large number of the population in this delta area live in boats and move about in the creeks and rivers. Cases were naturally very difficult to detect and it was also difficult to carry out vaccination amongst them in anything like a general way."

(*c*) *Isolation Hospitals.*

Such information as is available of the vaccinal history of smallpox patients treated in institutions is given in Table II (*xviii*).

TABLE II (*xviii*).

	Smallpox patients.	One or more vaccination scars.	Stated to have been successfully vaccinated but no vaccination scar present.	Stated to have been unvaccinated or vaccinated unsuccessfully but no vaccination scar present.	Previously unvaccinated but vaccinated during incubation of smallpox.	Stated to have been successfully revaccinated.	Particulars not available.
Total	**3,191**	**1,726**	**389**	**829**	**66**	**131**	**51**
U. P.	568	244	21	261	1	3	38
Bengal	1,805	1,017	310	301	63	112	2
C. P.	191	147	1	38	1	4	..
Bombay	125	..	51	63	..	..	11
Madras	210	186	5	18	1	..	..
Assam	14	1	..	1	..	12	..
Burma	278	131	..	147	..	..	..

TABLE II (*xix*).

Vaccinal condition of patients treated at medical institutions in Bengal.

	Vaccinated as shown by presence of one or more vaccination cicatrices.	Admissions from smallpox.	Stated to have been successfully vaccinated but bearing no vaccination cicatrices.	Stated to be unvaccinated or vaccinated unsuccessfully bearing no vaccination mark.	Previously unvaccinated but vaccinated during incubation of smallpox.	Stated to have been successfully revaccinated.	Type.					Age.				
							Modified.	Discrete.	Semi-confluent.	Confluent.	Hæmorrhagic.	Under 1 year.	1 year and under 10.	10 years and under 20.	20 years and under 30.	Above 30.
Total . .	**1,805**	**1,017**	**310**	**301**	**63**	**112**	**148**	**530**	**520**	**475**	**130**	**18**	**56**	**249**	**847**	**633**
Burdwan . .	97	23	21	25	18	10	39	20	15	17	6	9	9	13	27	39
Birbhum . .	3	...	...	2	...	1	1	...	1	1	...	...	1	...	1	1
Bankura . .	4	...	...	4	...	...	2	...	2	...	...	...	3	...	1	...
Hooghly . .	11	11	...	...	...	...	11	...	...	...	...	...	...	...	5	6
Howrah . .	73	12	4	57	...	...	4	16	29	17	7	...	1	5	27	40
Calcutta . .	1,452	861	275	175	43	98	43	426	440	430	113	6	31	211	708	496
Nadia. . .	5	4	...	...	...	1	4	1	...	...	...	...	...	...	2	3
Dinajpur . .	5	4	1	...	...	...	1	2	1	1	...	...	...	...	4	1
Murshidabad .	6	4	2	...	...	...	4	1	1	...	...	...	...	...	4	2
Darjeeling . .	3	3	...	...	...	...	...	2	1	...	...	...	...	...	3	...
Rangpur . .	1	1	...	...	...	...	...	1	...	...	...	...	...	...	1	...
Bogra . .	6	2	2	2	...	...	1	4	1	...	...	...	...	4	...	2
Pabna . .	11	4	2	3	2	...	4	6	...	1	...	...	...	2	6	3
Dacca . .	40	21	...	19	...	...	19	...	16	1	4	...	6	5	16	13
Faridpur . .	63	48	2	11	...	2	1	48	8	6	...	1	1	3	35	23
Bakarganj . .	15	11	1	3	...	...	8	1	5	1	...	2	2	4	5	2
Tippera . .	8	8	...	...	...	...	6	2	...	...	...	...	2	2	2	2

Fevers.

(a) *General.*

17. A total of 3,530,299 deaths were ascribed to this cause, against 3,456,144 in 1932 and 3,662,557, the decennial mean. Of this total, 2,545,845 deaths, or 72 % were recorded in Northern India comprising the Punjab, United Provinces, Bihar and Orissa, and Bengal. As usual, the Bombay and Madras Presidencies and Burma recorded low mortality. *See* Table (G) in Appendix II (page 332). 3,349,586 deaths were registered in rural and 180,713 in urban areas, as against 3,272,598 and 183,546 in 1932 ; and 1,823,795 were males and 1,706,504 females. The rural rates exceeded the urban in every province. In the North-West Frontier Province, Punjab, Delhi, Bengal, Bombay, Coorg and Ajmer-Merwara the female death rate was higher than the male.

Table II (*xx*) gives an analysis of the "fevers" figures for a few provinces. Although it is not easy to draw deductions from these statistics, they may be taken as giving some indication of the incidence of malaria in the different provinces. The kala-azar figures are also reasonably accurate.

(b) *Provincial.*

North-West Frontier Province.—The death rate was 19 p. m. or slightly in excess of the quinquennial mean. Maximum mortality occurred in November and December with 5,094 and 5,234 deaths and the minimum in April with 2,419 deaths. The districts of Kohat, D. I. Khan and Bannu recorded the highest death rates.

Punjab.—The fever death rate of 19 p. m., exceeded that for 1932 and the quinquennial mean and, as in the previous year, the rate for females (21 p.m.) was higher than that for males (18 p.m.). The highest mortality was registered during the months of October—December when malaria was said to be rife. As usual, the rural population paid a higher toll of life than town dwellers. Every district except 5 recorded death rates above the provincial average varying between 35 in Gujranwala, 11 in Kangra and 4 in Simla.

Delhi.—The death rate exceeded the quinquennial mean by 2 p. m. Deaths among males numbered 5,332 and those among females 5,706, the corresponding death rates being 26 p. m. and 14 p. m. The rural population recorded a higher rate than the urban, the death rates being 31 and 11 p. m., respectively.

United Provinces.—The death rate was lower than that of 1932 and the quinquennial mean. The maximum mortality was recorded in May and the minimum in February. The district of Bulandshahr in the Meerut division recorded the highest rate of 27 p. m. The urban rate dropped by nearly 10 % and the rural by 20 %.

Bihar and Orissa.—Compared with 1932, the death rate rose slightly but it was still well below the decennial mean. High death rates were

TABLE II (*xx*).

		Enteric fever.		Malaria.		Relapsing fever.		Kala-azar.		Measles.		Other fevers.	
		Deaths.	Rate p.m.	Deaths.	Rate p.m.	Deaths.	Rate p.m.	Deaths.	Rate p.m.	Deaths.	Rate p.m.	Deaths.	Rate p.m.
Delhi	R.	126	0·6	4	..	..	..	..	..	24	0·1	6,043	29·3
	U.	354	0·8	68	0·1	..	..	..	..	166	0·4	4,176	9·2
	Total	480	0·7	72	0·1	..	..	..	..	190	0·3	10,219	15·5
U. P.	R.	5,894	0·1	609,166	13·3	449	..	401	..	10,441	0·2	27,164	0·6
	U.	1,421	0·4	16,528	4·3	61	..	103	..	1,992	0·4	24,553	6·4
	Total	7,315	0·1	625,694	12·6	510	..	504	..	12,433	0·3	51,717	1·0
Bengal	R.	9,311	0·2	410,690	8·8	5,148	0·1	12,758	0·3	4,051	0·1	355,093	7·5
	U.	1,715	0·5	3,232	0·9	25	..	689	0·2	447	0·1	9,234	2·6
	Total	11,026	0·2	413,922	8·2	5,173	0·1	13,447	0·3	4,498	0·1	364,327	7·2
Bombay	R.	4,953	0·3	27,590	1·5	..	..	..	..	1,993	0·1	139,194	7·7
	U.	1,346	0·3	2,784	0·7	1	..	..	..	2,197	0·5	16,263	3·8
	Total	6,299	0·3	30,374	1·4	1	..	..	..	4,190	0·2	155,457	6·9
Coorg	R.	3	..	2,732	17·7	..	..	..	..	..	..	241	1·6
	U.	1	..	38	3·9	1	..	..	..	..	..	42	4·3
	Total	4	..	2,770	16·8	1	..	..	..	..	..	283	1·7
Burma	U.	248	0·2	1,704	1·2	..	..	3	..	34	..	2,096	1·5

recorded in the districts of Angul (23 p. m.), Purnea (21) and Balasore (20). The highest mortality was recorded during the months of October, November and December. The D. P. H. says :—

> " Although there has been some reduction in the fever mortality during the last decennium, it cannot be attributed to any organised anti-malarial measures in the province."

Bengal.—Fevers accounted for 68 % of the total mortality. The death rate was 18 % higher than in 1932 and 13 % higher than the quinquennial mean. The mortality curve, which rose in November 1932, dropped in February 1933, reaching its minimum in March ; from April to September it had a fluctuating course but then rose suddenly in October and reached its maximum in December. 15 districts registered rates in excess of the provincial average; 10 districts headed by Rajshahi returned rates between 20 and 26 p. m.; 14 between 10 and 20 p. m., and 3 below 10 p.m. Compared with the decennial average, 12 districts showed higher mortality whilst the rate for 1932 was exceeded in every district except Darjeeling and 24-Parganas. The urban death rate increased by nearly 13 % and the rural rate by 18 % over the figure for 1932.

Central Provinces.—The fevers death rate was well below the quinquennial mean. Mortality from fevers is generally high in the less developed districts owing to the difficulties experienced in carrying out preventive measures. Maximum incidence occurred in October and minimum in July but mortality was also high in April, September, November and December. The rural death rate was nearly double the urban.

Bombay Presidency.—Compared with the quinquennial mean, the death rate was low, but it was slightly over the rate for 1932 and was higher in rural than in urban areas and among females than among males. All the high urban rates were in the Presidency proper. The district mortality varied between 15 p. m. in Broach and 13 p. m. in Panch Mahals. Maximum mortality occurred in January and November and minimum in June.

Madras Presidency.—Fevers deaths increased by 8,766 but the death rate still remained below the quinquennial mean. Mortality was high in the months of October to December and low from February to May. The incidence was as usual high in the districts of Vizagapatam, Ganjam, Kurnool and Bellary, the death rates varying between 15 p. m. and 10 p. m.; as in previous years, a low rate was recorded in Tanjore district. The rural death rate was nearly double that of urban areas. Deaths among males numbered 149,878 and among females 150,304.

Assam.—Deaths from fevers have been on the increase since 1929, the number in the latter year being 83,520 and 103,890 in the year under report. The increases have occurred chiefly in rural areas. The death rate for 1933 exceeded that for the previous year and the decennial mean in every district except one. Mortality was highest in Goalpara district. June and July recorded the maximum mortality and February and March the minimum.

Burma.—The death rate rose by 0·8 p. m. and 0·2 p. m. as compared with the figure for 1932 and the quinquennial mean. The largest number of deaths were registered in December and the lowest in February. In the rural areas the number of fever deaths increased by 10,364 and the death

rate rose above the rate for 1932 and that of the quinquennial mean. The highest rural death rates were recorded in the districts of Shwebo (18 p. m.), Minbu (16) and Mandalay (13). The urban rate was lower than that of 1932 and the quinquennial mean.

Malaria.

18. Over 12½ million diagnosed cases of malaria were treated in hospitals and dispensaries as compared with less than 11 million cases in 1932. Except Bihar and Orissa, Central Provinces, Bombay and Coorg, all provinces recorded increases, the largest being in the Punjab (+ 1,186,544), Bengal (+633,020) and North-West Frontier Province (+188, 814). Table II (*xxi*) gives the numbers of malaria cases and their percentages to total cases treated in each province during 1932 and 1933.

TABLE II (*xxi*).

	Cases.		Percentage to total cases treated.	
	1933	1932	1933	1932
Total	12,602,145	10,883,599	16·8	15·0
N.-W. F. P.	627,024	438,210	29	25
Punjab	3,062,837	1,876,293	20	13
Delhi	165,439	139,770	15	14
U. P.	1,076,445	1,018,305	13	13
B. & O.	882,463	1,057,842	12	15
Bengal	3,424,800	2,791,780	34	30
C. P.	386,142	404,667	11	12
Bombay	690,551	939,468	18	17
Madras	1,050,146	1,031,363	6	6
Coorg	98,760	105,715	29	36
Assam	737,721	697,072	30	28
Burma	399,817	383,114	12	13

The relationship of the incidence of malaria with rice cultivation was alluded to in paragraph 16 (page 47) of my Annual Report for 1931. Since then, the breeding of anopheles in relation to rice cultivation has been investigated * in Lower Bengal by Mr. Purnendu Sen, Entomologist, P. H. Department, Bengal. In his introductory remarks Mr. Sen says :—

" There has been a tendency during recent years among certain malariologists to associate the paddy fields in the proximity of human habitations with the malariousness of a place. That is to say, the rice fields have been considered by many as the chief

*Records of the Malaria Survey of India, Vol. V, No. 1, Page 97 (March, 1935).

source of Anopheline output in a locality, the water accumulating in these fields furnishing the necessary breeding surfaces for these mosquitoes. This suspicion has naturally induced certain municipalities and other corporate bodies responsible for public health to prohibit wet cultivation within a mile or a half of their jurisdiction."

"Rice being the staple food of this province, this prohibition might cause great distress to the people, and the matter, therefore, deserves serious consideration from the public health authorities of the country. The mere presence of rice swamps might not be sufficient to indicate that the place would be malarious. As one can understand, this would greatly depend on the extent to which the cultivation is found to afford breeding facilities to those Anophelines which are known to transmit malaria."

"But unfortunately, we are not fully aware what exact rôle is being played by the rice swamps under normal circumstances on the life and distribution of these carrier species of Anophelines. Wide divergence of opinion on this point exists amongst different workers, some claiming their complete dissociation in the causation of malaria while others consider the rice fields as the main source of trouble."

The investigation covered a period of 2 years, from October, 1932, to September, 1934. His important conclusions are reproduced below:—

"The intensity of Anopheline breeding in the paddy fields of Bengal villages varies in different localities. It is not always that the amount of breeding in these fields is greater than the breeding of Anophelines in other types of water collections in the villages."

"The breeding in the paddy fields commences in July and ends in January following. The maximum breeding, however, takes place in September."

"The presence of paddy fields in the vicinity of villages does not always signify that the place will be malarious, nor do the paddy fields always breed carrier species of Anopheles."

"The species noted from the different paddy fields are—*A. hyrcanus* var. *nigerrimus*, *A. barbirostris*, *A. subpictus*, *A. vagus*, *A. varuna*, *A. aconitus*, *A. ramsayi*, *A. annularis*, *A. phillipinensis*, *A. pallidus*, and *A tessellatus*. Of these *A. varuna*, *A. annularis*, *A. phillipinensis* have been reported to be infected in nature in Bengal."

"The species, *A. pallidus* and *A. tessellatus*, occur only very rarely, and *A. hyrcanns* var, *nigerrimus* Comprises nearly 50 % of the total catch."

North-West Frontier Province.—In Peshawar district alone the special malaria staff treated 33,474 cases. The I. G. C. H. reports the prevalence of the disease in severe form.

Punjab.—The usual malaria forecast was issued. Owing to favourable climatic conditions, an epidemic of considerable intensity was anticipated in the districts of Amritsar, Sialkot and Gujrat and major portions of Gurdaspur, Gujranwala and Jhelum. Isolated foci of moderate intensity were also expected, particularly in the flooded areas along the Jumna, Sutlej and Indus rivers. High fever mortality in the months of October to December was no doubt due to the increased prevalence of malaria. Because of heavy floods in September, 1933, the intensity of malaria in the districts of Rohtak, Gurgaon and Karnal was greatly aggravated not so much by new infections as by relapses of old infections.

Delhi.—The recorded malaria death rate was 0·1 p. m. as compared with a "fevers" death rate of 17·3 p. m. Only 72 deaths were recorded as due to malaria,—36 in Delhi city, 21 in New Delhi, 7 in the fort, 4 in the notified area and 4 in the rural areas. In many rural tracts the malarial incidence is believed to be very high particularly in the riverine areas and the spleen index is frequently as high as 85 %. It is almost certain, therefore, that

the malaria and "fevers" figures have to be taken together to obtain a true picture of the incidence of malaria in this province.

United Provinces.—Outbreaks of malaria were reported in the districts of Meerut, Moradabad, Aligarh, Nainital, Muzaffarnagar, Saharanpur, Bahraich, Gorakhpur, Bulandshahr and Muttra. In the first three, the epidemic was localised and sporadic; in others, particularly those bordering on the Punjab and Delhi Province, more generalised epidemic conditions prevailed owing to heavy rainfall and floods during the retreating period of the monsoon. Of the 21,566 villages in these districts, 4,431 were affected. Among the municipalities, Agra, Hathras and Hapur reported outbreaks. In Lucknow, although the spleen rate has steadily decreased, malaria still constitutes an important cause of sickness during the summer and post-monsoon periods. In the Sarda canal area, weather conditions were not favourable for a high malarial incidence and a low spleen index was recorded; some villages along the Hardoi branch in the Shahjahanpur district, particularly the upper portions, and certain areas in the districts of Hardoi, Unao, Lucknow and Rae Bareli have been severely affected since the opening of the canal.

Recorded malaria deaths totalled 625,694 (13 p. m.) or nearly 90 % of the fever deaths, but the reliability of this figure is doubtful.

Bihar and Orissa.—The exact incidence is unknown but large portions of Orissa and almost the entire districts of Singhbhum, Purnea and North Bhagalpur are reported to be malarious.

Bengal.—Recorded deaths numbered 413,922 giving a death rate of 8 p. m. High death rates were returned by the districts of Nadia 20 p. m., Rajshahi 19, Jessore 18, Malda 18, Dinajpur 13, Murshidabad 15, Birbhum 14, Pabna 13, Rangpur 12, Bogra 12, Faridpur 11 and Jalpaiguri 11.

Central Provinces.—A high mortality from fevers from September to December was ascribed to malarial prevalence. Judging from attendances at hospitals and dispensaries, the districts which suffered most were Buldana 41,527 cases, Nagpur 35,214, Amraoti 32,466, Akola 32,381, Saugor 26,744, Nimar 26,557 and Chhindwara 24,613.

Bombay Presidency.—A total of 30,374 deaths was recorded; in the Central Registration district 15,738, Southern 8,313, Northern 4,650 and Sind 1,605. In Bombay City only 68 malaria deaths were registered. The provincial death rate was 1·4 p. m.; the rural rate 1·6 p. m. and the urban 0·7 p. m. The highest rural rates were recorded in the districts of Nasik (8 p. m.) and Dharwar (4).

Madras Presidency.—A high mortality from fevers in the districts of Vizagapatam, Ganjam, Kurnool and Bellary was attributed to malaria.

Assam.—Malaria is the greatest scourge of this province being prevalent throughout and almost constantly present in epidemic form. A total of 626,199 cases of malaria were treated in the plains' districts at the local boards and medical department dispensaries; those treated at the public health department dispensaries numbered 39,135.

Burma.—Malaria continued to cause an extensive amount of sickness and mortality in the rural areas, particularly in the districts of Shwebo.

Minbu, Mandalay, Pakokku, Prome, Akyab, Lower Chindwin and Kyaukse. In addition, Hanthawaddy district had severe outbreaks in April and December and Shwebo in September. In urban areas, malaria deaths totalled 1,704 giving a death rate of 1·2 p. m., a figure less than that of 1932 and of the quinquennial mean.

Anti-Malarial Measures.

19. *North-West Frontier Province.*—The military authorities carried out anti-malarial measures in Peshawar and Kohat cantonments and in the surrounding villages. In other places, anti-malarial gangs were at work under medical supervision. Cultivated areas in the cantonments referred to were treated with paris-green and springs, *nullahs* and other collections of water were oiled at regular intervals.

Punjab.—Owing to inundation from the rivers and to exceptionally heavy rains during September, large areas in the districts of Rohtak, Gurgaon and Karnal were flooded. Relief measures on an extensive scale, in addition to quinine distribution, were launched.

Delhi.—Measures carried out in urban areas included the systematic weeding of water channels and flooded areas, the use of paris-green, crude oil, oil-balls and bags and the drainage of stagnant water. Anopheline mosquitoes identified included *A. stephensi*, *A. subpictus* and *A. culicifacies*. In rural tracts, in addition to the distribution of quinine, oil and paris-green were used during the malarial season.

United Provinces.—Early in spring and in autumn the whole population in the Banbassa headworks of the Sarda canal were given "blanket" treatment, which consists of the administration of quinine and plasmoquine twice a day for 3 days as an anti-relapse and anti-gametocyte measure. Jungle clearance and filling in of marshes was also carried out and, as a result, in the Banbassa colony which is always subject to immigration from highly endemic areas, malaria was kept under control. In the Tarai and Bhabar estates, paris greening was constantly practised.

The malarial survey of Gorakhpur municipality was completed; those of Unao and Sambhal municipalities were commenced; and Lucknow municipality and Kosi notified area were being resurveyed. In Lucknow, with a diminished spleen rate, malaria is said to be still an important cause of sickness during the summer and post-monsoon periods due chiefly to its numerous wells and to a defective drainage system. Further progress was made with the investigation to determine the effects of canal irrigation on waterlogging and the malarial incidence in the Sarda canal area and in the villages of the same districts where no canals or irrigation facilities exist. The pooled spleen rate of the villages under canal irrigation was found to be 11·6 % as against 3·5 % in the other group of villages. It is proposed to continue this investigation for some years in order that definite conclusions may be reached. In order to determine the seasonal prevalence of malaria among school children specially in the spring and autumn, splenic indices were taken in the districts which employed M. O. Hs.

Scout organisations and Junior Red Cross groups were trained in anti-malarial measures at 156 centres.

26 municipalities have adopted anti-malarial byelaws regulating the digging of excavations, etc.

Advanced courses of instruction in malariology, including field work were given to 14 officers of the Public Health Department; and a short elementary course of instruction and practical training was given to 22 candidates for the sanitary inspector's course.

A provincial malaria sub-committee of the Board of Public Health was formed with the object of examining and advising on anti-malarial projects, etc.

Bihar and Orissa.—Following the recommendations made after carrying out an anti-malarial survey of Purnea municipality, a few treatment centres were opened in the town. These were attended by a special doctor appointed by the municipality, who also carried out house to house visits. The survey of Madhubani town was completed. Spleen censuses in the districts of Ranchi, Chaibassa, Sambalpur, Cuttack, Angul, Puri, Balasore and Manbhum were carried out.

Of the 15,348 children examined, 1,874 in 467 villages showed splenic enlargements, the districts showing the highest rates being Angul, Balasore and Ranchi.

Bengal.—The research work started in 1930 in the Saili Tea Estate in the Jalpaiguri Duars was continued. 2,498 mosquitoes were dissected and infection was found to exist throughout the whole year, the infectivity varying between 0·6 per cent. in August and 10 per cent. in June. *A. minimus* was found to be the vector and the 2,081 mosquitoes of this species dissected gave a combined zygote and sporozoite rate of 4·4 per cent. as against 5·5 per cent. in 1932. Since the discovery of *A. Ludlowii*, a highly infected species with a natural infection rate of 23·8 per cent. in the jute mill areas at Budge-Budge in October 1930, continuous survey and control work has been carried out in that area.

Central Provinces.—Routine anti-malarial measures were continued in Pachmarhi, Nagpur, Jubbulpore, Khandwa and Burhanpur. An epidemic dispensary was at work in the Melghat forest area and in the adjoining *ryotwari* tract in Amraoti district.

Bombay Presidency.—Forty-four specially trained medical officers were detailed by the D. P. H. for the treatment of malaria cases and for visiting malarious tracts. A total of 3,596 villages were visited and 71,067 cases of malaria were treated. Of the 68,949 children examined, 25,285 had enlarged spleens. Two trained malaria officers were employed in Poona district and they surveyed 35 villages within a radius of 10 miles round Poona city.

Madras Presidency.—The reserve first class health officer, appointed as Malaria Officer in February, 1932, continued to be in charge of malaria work. Surveys were limited to a number of areas where recommendations based on these surveys were likely to be acted upon. The scheme of free distribution of quinine was extended to two of the surveyed areas. Treatment of breeding grounds, such as drying river-beds, with paris green was carried out on a restricted scale in a number of villages in the Vizagapatam Agency; striking results were obtained at the small cost of 5 1/3 annas per head per annum. Spleen rates which varied from 19 % to 70 % before the scheme was started in 1929 now range between 6 % and 25 %. The scheme of subsoil drainage at Koraput was not completed owing to shortage of funds. Anti-malarial measures were successfully continued in the Cauvery-Mettur Project area; in the Rameswaram Island the spleen rate has diminished from 11 % in 1929 to 6 % in 1934 as a result of suitable measures.

Assam.—The local Government sanctioned Rs. 26,000 for anti-malarial measures and survey and treatment work was undertaken in 28 different areas. A total of 150,099 specimens,—122,426 larvæ and 27,673 adult mosquitoes,—were collected. *A. minimus* showed the highest infectivity rate. Infection of *A. maculatus*, which had only once before been noted in India, was recorded in specimens caught in Shillong. 33,540 blood films were examined of which 20 % were positive; out of 34,859 splenic examinations, 19·5 % were found enlarged. Two training classes were held. Rice bran was found to be a suitable diluent for paris-green. Research work included the life histories of *A. maculatus* and *A. minimus*.

Burma.—Owing to financial stringency, it was not possible to carry out much more than palliative measures, but organised anti-malarial measures were in progress in Kyaukpyu, Akyab, Kalaw, Lashio and Sahmaw. Briefly, these consisted of reclamation of borrow pits and low-lying lands, drainage improvements, oiling, the use of paris-green, etc. In Kyaukpyu, the spleen rate decreased from 12 % to 10 %. In Akyab, byelaws were adopted to regulate the collection of storage of water in order to prevent mosquito breeding. In Kalaw, the spleen rate in the immediate neighbourhood of the town was reduced from 15·4 % to 4·5 %; larvivorous fish such as Gambusia were bred but the results were not very successful. In Sahmaw, the spleen rate which 4 years ago was 73 % fell to 29 % in 1933.

Quinine.

20. Details of the amounts of quinine and cinchona febrifuge issued in districts in each province will be found on pages 335-341. The figures make it clear that in no area are adequate amounts of the drug available.

Botanical Survey of India.—At the close of 1933-34 the total Government of India stock of quinine sulphate purchased as such and extracted from Java and Burma barks amounted to 267,657 lbs. as against 282,759 lbs. in 1932-33. Of this total 65,075 lbs. were at the Indian Museum, 194,637 lbs. at Mungpoo, 612 lbs. at Naduvattam, and 7,333 lbs. on the way from Mungpoo to the Indian Museum. The total stock of cinchona febrifuge amounted to 21,146 lbs., as against 22,965 lbs. in 1932-33, including 7,638 lbs. in the Indian Museum, 10,998 lbs. at Mungpoo, 2,398 lbs. at Naduvattam, and 112 lbs. at Alipur jail. Quinine amounting to 13,435 lbs. was distributed as to the Punjab 8,929 lbs., U. P. 1,917 lbs., N.-W. F. P. 549 lbs., Central India 468 lbs., Delhi 172 lbs., Baluchistan 247 lbs., Rajputana 621 lbs., Kashmir 45 lbs., 6 lbs. to other places and 481 lbs. to the trade. Direct sales of cinchona febrifuge amounted to 426 lbs. and indirect sales through the Presidency jail, Alipur, to 4,574 lbs.

Government Cinchona plantations and Factory in Bengal.—A total of 1,131,960 lbs. of bark was harvested, whilst 1,659,090 lbs. were available from the previous year. Altogether 1,436,796 lbs. were utilised in the factory of which 1,268,365 lbs. belonged to the Bengal Government and the balance to the Government of India. The products obtained were 51,094 lbs. of quinine sulphate, including 3,085 lbs. in process, and 28,523 lbs. of cinchona febrifuge, the distribution according to sources being—

	Quinine Sulphate. lbs.	Cinchona febrifuge. lbs.
Munseong bark	37,309	20,508
Mungpoo „	8,419	4,621
Burma „	2,805	2,367
Java „	2,561	1,027
Total	51,094	28,523

The total cost of the bark was Rs. 4·72 per lb. and that of extraction of quinine was Rs. 2·721 per lb. Thus the production of quinine has cost Government Rs. 7·441 per lb.

Table II (*xxii*) gives details of the manufacture and disposal of the factory products to the nearest lb.

TABLE II (*xxii*).

	Balance on 1st April 1933.	Manufactured.	Returned to stock.	Total.	Issued or sold.	Converted to other products.	Balance on 31st March 1934.
Quinine sulphate powder.	19,991	24,022	92	44,105	15,186	21,460	7,459
,, ,, crude	109,240	25,703	...	134,943	5,294	2,687	126,962
Other quinine salts	375	803	...	1,178	686	...	492
Quinidine sulphate tablets	750	6,169	6	6,925	5,497	...	1,428
Cinchonine salts	50	...	...	50	...	...	50
Cinchonidine salts	50	...	...	50	...	...	50
Quinidine	211	...	...	211	117	...	94
Cinchona febrifuge powder	3,065	19,838	156	23,059	15,015	6,435	1,609
,, ,, tablets	957	6,075	32	7,064	6,025	...	1,039
Quinine sulphate tablets (boxes).	21,910	130,676	1,254	153,840	134,177	5*	19,658

* Written off.

Madras Government Cinchona Department.—A total of 22,716 lbs. of quinine sulphate was produced, including quinine sulphate and tablets 20,999 lbs., quinine hydrochloride 1,348 lbs., quinine dihydrochloride 588 lbs., cinchona febrifuge 13,141 lbs. and totaquina 2,124 lbs.

A total of 535,000 lbs. of cinchona bark was treated; 263,414 lbs. were purchased locally and 271,586 lbs. were obtained from government plantations; only 129,731 lbs. were available for purchase from private planters.

The total yield of cinchona bark amounted to 149,011 lbs. at the Anamallais plantations; 140,809 lbs. at Naduvattam; and 52,817 lbs. at Dodabetta.

Total sales of quinine salts amounting to Rs. 4,77,118 during 1933-34 are detailed in Table II (*xxiii*). The price of quinine has remained at Rs. 18 per lb. since 1931. The demands for quinine from Indian States fell from 4,000 lbs. in 1930-31 to well below 2,000 lbs. during 1933-34.

TABLE II (*xxiii*).

	Quinine sulphate.	Cinchona febrifuge.	Cinchona febrifuge tablets.	Quinine Sulphate tablets.	Quinine hydro-chloride.	Quinine di-hydro-chloride.	Quinine bi-sulphate and tablets.	Totaquina.	Cinchona bark.
Total	**16,795**	**7,153**	**763**	**1,803**	**359**	**1,063**	**150**	**1,852**	**789**
Director of Public Health	..	..	..	1,200	..	..	..	..	..
Government Hospitals	1,167	144	4	105	13	6	..	664	..
Local Fund Institutions	1,279	416	4	143	..	..	..	361	..
Municipal Institutions	481	71	..	12	16	..	..	50	..
Medical Store Depot—									
(*a*) Madras	1,010	50	..	..	27	570	..	120	290
(*b*) Bombay	4,000	750	..	..	50	407	..	..	275
(*c*) Calcutta	..	..	..	..	..	..	..	100	..
Yeravda Prison, Poona	2,530	..	..	..	200	..	..	..	..
Burma	2,000	1,710	..	..	10	80	..	..	..
Central Provinces	2,220	760	..	..	15	..	..	..	..
Coorg	152	102	118	131	..	..	38	..	..
M. and S. M. Railway	60	20	246	..	..	..	..	..	..
Public	..	1,336	65	..	..	..	..	10	..
Indian States	1,672	1,174	280	210	28	..	..	..	224
Miscellaneous	224	620	46	2	..	..	112	547	..

North-West Frontier Province.—Plasmoquin and quinine were used in treating malaria patients in hospitals and quinine and cinchona febrifuge were distributed free amongst the poor.

Punjab.—On the basis of the malaria forecast issued, 2,785 lbs. of quinine and 849 lbs. of cinchona febrifuge were sold by the Public Health Department in rural areas especially in those likely to be threatened with the autumnal epidemic. In addition, 498 lbs. of quinine were issued free. In the severely infected districts of Rohtak, Karnal and Gurgaon an attempt was made for the first time to give a course of quinine treatment to each patient comprising a dose of magnesium sulph., 3 doses of alkaline quinine mixture for the first day and 9 quinine pills for the 3 following days. In these 3 districts alone 1,017 lbs. of quinine sulphate and cinchona febrifuge were distributed.

Delhi Province.—396½ lbs. of quinine and 272 lbs. of cinchona were consumed at a cost of Rs. 784 and Rs. 1,567 to the district board and the local administration respectively.

United Provinces.—The Government quinine tablet factory manufactured and issued 681 lbs. of quinine and 1,458 lbs. of cinchona to post offices and others and the total amount realised from sales aggregated Rs. 32,305. To replenish district stocks 266 lbs. of cinchona were also issued from reserves to the districts of Pilibhit, Bulandshahr, Muzaffarnagar, Muttra and Gorakhpur. In addition, 433½ lbs. of quinine powder of the D. P. H.'s reserve were converted into tablets. Free distribution was made of over 200 lbs. of quinine and 289 lbs. of cinchona by the Public Health Department and of 12½ lbs. of quinine and 10 lbs. of cinchona by the Prison Department. 154 lbs. of cinchona and 80 lbs. of quinine were issued free in the villages of the Tarai and Bhabar estates; in 18 villages in these estates the cinchona-plasmoquin treatment scheme was also used. In 10 districts where malaria was in epidemic form, reserve stocks were utilised for free distribution in 4,431 affected villages and 398 lbs. of quinine and cinchona tablets were distributed in the treatment of 84,689 persons. Under the " rural mass treatment scheme ", 1,347 cases were treated in 20 groups of villages in the districts of Lucknow, Hardoi and Unao with drugs supplied by the P. H. Department; among these the clinical seasonal relapse rate was 6·3 %. The scheme was also in force in Kosi notified area, in 197 and 47 rural centres respectively in the districts of Pilibhit and Budaun and in 5 villages in the Partabgarh health unit area. The Shahjahanpur Rural Uplift Association distributed 31 lbs. of cinchona free at 220 centres serving some 2,000 villages. In Gorakhpur, a sale scheme, under which the district board subsidises 80 % of the cost of the drug and the remaining 20 % is realised from sales, was introduced in a selected area in the district; the drug was issued in one rupee packets containing 16 half anna and 32 quarter anna packets of 60 and 30 grains, respectively; 54 lbs. of the drug were sold. In Mirzapur district also 12 lbs. of cinchona were used to treat 1,391 cases.

Bihar and Orissa.—Quinine requirements are obtained from the Presidency jail at Calcutta. 345 lbs. of quinine sulphate were sold through post offices at 5½ annas per treatment of 20 tablets packed in small glass tubes. The largest quantities were taken by the districts of Purnea, Cuttack, Santal Parganas, Balasore, Bhagalpur and Muzaffarpur.

Bengal.—13,329 lbs. of quinine were issued by the P. H. Department; the amounts varied between 4·2 grains per head of population in Chittagong district, 3·5 each in Tippera and Faridpur, 2·7 each in Dacca and Jessore, and 0·4 each in Howrah and Darjeeling. The local Government sanctioned a sum of Rs. 40,000 for free distribution of quinine at 50 grains per head of

population in the highly malarious *thanas* of Burdwan *Sadr*, Arambagh in Hooghly, Paba in Rajshahi, Rajbari in Faridpur and Chakdaha in Nadia. Experimental treatment with quinine and plasmochin was carried out in April in a population of 21,400 persons in 97 selected villages in Burdwan district where the spleen index varied from 60 % to 80 %. The scheme provided for mass treatment with quinine during the months of April to June when mosquitoes are fewer. In addition, plasmochin was given in daily doses of 0·02 grammes to adults and proportionately less to children for 3 consecutive days. From July onwards, 30 treatment centres under 6 doctors were opened in this area. The intensity of the infection during the malaria season from July to October was much less than in the surrounding areas.

Central Provinces.—2,220 lbs. of quinine sulphate, 60 lbs. of cinchona febrifuge and 15 lbs. of quinine hydrochloride were purchased from the Madras factory and supplied to the Nagpur jail factory. The scheme of free distribution of quinine in hyper-endemic areas in the districts of Betul and Nimar and in the *jagirs* of Chhindwara district was continued with satisfactory results.

Bombay Presidency.—The local Government sanctioned Rs. 30,000 for the free distribution of quinine, Rs. 30,000 for sale of the drug through post offices, and Rs. 9,700 for the cheap sale of quinine hydrochloride treatments. The figures of actual expenditure were Rs. 29,360, Rs. 18,470 and Rs. 5,477, respectively. The system of free distribution of the drug was revised so as to ensure its supply to the remotest villages and to utilise available funds to the fullest advantage. The main channel of distribution will in future be the officers of the Public Health Department, district schools and local boards having M. O. Hs., these being assisted by officers of the revenue department. 565,000 quinine pills of 5 grains each and 1,921,000 pills of 2 grains each were issued for free distribution in Sind ; 313,850 of 5 grains and 356,850 of 2 grains in the Southern Registration district ; and 57,452 of 5 grains and 71,915 of 2 grains in the Central Registration district. In addition, 15,000 pills of 5 and 2 grains each were supplied for distribution to the A. D. P. H., Southern Registration district. The district M. O. H., Dharwar, who quininised school children for a period of about 3 months has reported the following results :—

TABLE II (*xxiv*).

	Schools quininised.	No. examined.	No. with enlarged spleen.		Spleen rate.	
			Before.	After.	Before.	After.
Dharwar	6	278	39	18	14	7
Hubli	3	268	22	12	8	4
Kod	10	599	105	45	18	8
Kalghatgi	2	77	36	24	47	31

Madras Presidency.—The scheme of free distribution of quinine was financed entirely by Government and was at work in 13 districts. Although a sum of Rs. 45,000 sufficient to cover the distribution of 2,500 lbs. of quinine was sanctioned, only Rs. 25,000 were actually spent or the equivalent of about 1,300 lbs., whilst of a total population of about 1½ millions under the scheme, only 160,539 were treated. In the districts of South Kanara, Kurnool and Cuddapah, where most of the quinine was used, the total death rate and the fever death rate which had declined steadily during the period 1928—32, increased somewhat during 1933.

Assam.—8,648 packets of quinine of 10 treatments each were sold through post offices and other agencies at the rate of 4½ annas per treatment. Since the close of 1933, the Government have sanctioned the sale of "quinine reinforced cinchona febrifuge" containing 1 part of quinine to 3 parts of cinchona, each treatment consisting of 20 grains of quinine sulphate and 60 grains of cinchona febrifuge made into 20 tablets of 4 grains each. This treatment will be sold at 3¾ annas. The following quantities of quinine and cinchona febrifuge were obtained for free distribution in the badly infected districts :—

TABLE II (*xxv*).

	Quinine.		Cinchona.	
	lb.	oz.	lb.	oz.
Cachar	3	8	32	12
Sylhet	48	4	66	8
Goalpara	19	..	7	..
Kamrup	8	..	75	..
Nowgong	13	..	64	..
Sibsagar	5	7	3	5
Darrang	25	15	37	..
Total	123	2	285	9

Burma.—Cinchona febrifuge tablets continued to be manufactured at the Rangoon jail. 2,752,800 tablets were sold through treasuries and 336,600 were distributed free in 12 districts. The largest free supplies were made in the districts of Shwebo 62,000 tablets, Chin Hills 60,000, Insein 59,800, Myitkyina 43,000 and Minbu 40,000. The largest consumption of 11·36 grains per head of population was recorded in Bhamo district but only 4 grains per head were consumed in Myitkyina and 3 grains per head in Mergui. Table II (*xxvi*) gives the districts recording the highest death rates from fevers and their rates of consumption of cinchona febrifuge.

TABLE II (*xxvi*).

	Fever death rate.	Consumption per head of population in grains.
Shwebo	17	0·73
Minbu	15	2·11
Pakokku	12	0·18
Akyab	11	1·22
Lower Chindwin	11	0·23
Prome	11	0·57
Kyaukse	10	0·66
Tavoy	10	1·40

Dysentery and Diarrhœa.

21. These diseases were responsible for a higher mortality than in the previous year in Madras, Delhi, Bengal and Ajmer-Merwara. Of the total, 127,666 deaths were among males and 118,498 among females ; 199,161 deaths were registered in rural and 47,003 in urban areas and the urban death rate exceeded the rural in every province. Table II (*xxvii*) gives the number of deaths

from these diseases for each quarter during the quinquennium 1929—33. As usual the third quarter, which corresponds with the monsoon period, recorded the highest number of deaths.

TABLE II (*xxvii*).

	1929.	1930.	1931.	1932.	1933.
Total .	**235,470**	**237,892**	**268,331**	**222,804**	**246,164**
1st Quarter	48,202	49,237	50,386	50,976	**51,043**
2nd Quarter	50,974	54,483	54,267	47,089	**57,880**
3rd Quarter	68,789	70,143	89,694	64,514	**67,472**
4th Quarter	67,505	64,029	73,984	60,225	**69,759**

The highest rates were again recorded in the provinces of Madras, C. P., Assam and Bombay; and the lowest in N.-W. F. P. High mortality in Southern India and the Deccan plateau seems to be due chiefly to diarrhœa, whilst in Assam dysentery is the main cause.

In the *Punjab*, the hill districts of Kangra (3 p.m.), Rawalpindi (3 p.m.) and Simla (1 p.m.) reported the highest death rates; Muzaffargarh along the Indus river to the south-west the lowest. In the *U. P.*, the maximum mortality occurred in June and the minimum in February. The districts of Garhwal, Almora, Dehra Dun and Moradabad as usual returned the highest death rates. In *B. and O.* these diseases were as usual most prevalent in the Orissa division, partly owing to climatic conditions and partly to the bad state of water supplies. Compared with 1932, the number of deaths in *Bengal* was higher in every month except in August. The highest district death rate was 3 p.m. In the *C. P.*, 18,831 deaths or 85 % of the total were ascribed to diarrhœa. The Berar districts contributed more than half of the total deaths, the highest death rates being in Akola 5 p.m., Amraoti 4 and Buldana 4. The D. P. H., *Bombay*, writes:—

"Returns of diarrhœa and dysentery used to show an increase in early and late stages of cholera epidemics. Recently, however, it has been noted that many cases of diarrhœa are returned as cholera in the cholera season. Thus although the diagnosis in rural areas is just as faulty as before, the change shows that the village officers are more alert in reporting outbreaks of cholera. This conclusion receives further support from the fact that when cholera breaks out late diarrhœa and dysentery do not show a corresponding increase but they keep to their seasonal prevalence, *i.e.*, the early part of the rainy season."

In *Madras Presidency* the high mortality in the months of July and from October to December was probably due to the pollution of water supplies which follows the south-west and north-east monsoons. The highest mortality was recorded in the districts of Coimbatore, Malabar, Madura and Bellary.

In *Assam*, the districts of Lakhimpur (2·5 p.m.) and Sibsagar (2·1 p.m.) recorded the highest death rates. The use of bacteriophage was continued in Nowgong district but the number of deaths have increased to 322. In *Burma*, the death rate was low as compared with 1932 and the quinquennial mean. An outbreak of dysentery in the Chin Hills district, which was responsible for 1,459 cases and 224 deaths, was ascribed to the dirty habits of the people, insanitary surroundings and the resultant prevalence of flies coupled with the scarcity of water.

Such figures as are available are given in Table II (*xxviii*).

TABLE II (*xxviii*).

	Dysentery and diarrhœa deaths, 1933.	Death rate p.m. 1933.	Death rate p.m. 1932.	Deaths from diarrhœa.	Death rate p.m.	Deaths from dysentery.	Death rate p.m.
British India	**246,164**	**0·9**	**0·8**	**74,498**	...	**34,170**	...
N.-W. F. P.	289	...	...	...	...	...	...
Punjab	12,345	...	1	*1,328	1	*846	1
Delhi	616	1	1	398	1	218	...
U. P.	11,501	...	...	6,505	...	4,996	...
B. and O.	17,064	...	...	...	...	...	...
Bengal	46,697	1	1	25,980	...	20,717	...
C. P.	22,232	1	1	18,831	1	3,401	...
Bombay	23,162	1	1	20,314	1	2,848	...
Madras	97,584	2	2	...	...	...	...
Coorg	122	1	1	56	...	66	...
Assam	9,267	1	1	†76	...	‡238	1
Burma	4,902	...	...	‡1,010	1	‡840	1
Ajmer-Merwara	383	1	...	...	...	...	...

* For 13 larger towns in charge of whole time M. O. Hs.

† For 13 larger towns.

‡ For towns only.

Enteric Fever.

22. Table II (*xxix*) gives the numbers of cases treated in hospitals and dispensaries in the different provinces.

TABLE II (*xxix*).

	1933.	1932.
British India	**72,804**	**73,691**
N.-W. F. P.	1,290	1,186
Punjab	21,626	20,948
Delhi	1,118	1,055
U. P.	6,372	7,255
B. and O.	6,481	7,021
Bengal	12,446	11,735
C. P.	1,672	1,706
Bombay	5,266	6,675
Madras	14,344	13,836
Coorg	85	56
Assam	503	458
Burma	1,350	1,481
Baluchistan	251	279

Delhi.—The disease is said to be endemic in urban areas and particularly in Delhi city, due chiefly to flies and contaminated food. Deaths in these areas reported by the verifying agency totalled 393 of which 368 occurred in Delhi city and 25 in New Delhi. In rural parts the disease is not notifiable. Table II (*xxx*) gives deaths by months.

TABLE II (*xxx*).

	Delhi City.	New Delhi.	Total.
January	8	2	10
February	5	3	8
March	13	1	14
April	20	..	20
May	47	3	50
June	86	2	88
July	38	1	39
August	34	4	38
September	25	2	27
October	46	..	46
November	35	3	38
December	11	4	15

United Provinces.—7,315 deaths were ascribed to enteric fever, but these are said to be an underestimate as on verification of causes of death in certain areas the actual mortality for the whole province is believed to be about 11,600. Recorded deaths in rural and urban areas numbered 5,894 and 1,421, respectively.

Bengal.—Of the 11,026 deaths registered, 9,311 occurred in rural areas, 964 in Calcutta and 751 in other towns. Among rural districts, Rangpur (0·7) and Bakarganj (0·4) reported the largest death rates. Compared with 1932, the provincial death rate increased by 10 % in rural areas and in Calcutta by 11 % and in urban areas by 14 %.

Central Provinces.—The largest number of cases treated in hospitals and dispensaries were in the districts of Nagpur (282), Jubbulpore (250), Hoshangabad (134) and Buldana (127).

Bombay Presidency.—6,299 deaths were ascribed to this group of fevers, 4,953 in rural and 1,346 in towns. Bombay city alone recorded 237 deaths; in no other town did the number exceed 96. Of the rural deaths, over 42% occurred in the districts of Kolaba (772)i West Khandesh (732), Dharwar (587) and Thana (576).

Assam.—Sporadic cases of typhoid fever occurred in Gauhati 16, Dibrugarh 11, Sylhet 7 and in certain other places. T. A. B. inoculation of contacts and other suitable measures were carried out.

Burma.—The disease is not notified in rural areas. The urban death rate, 0·2 p.m., was the lowest on record. The D. P. H. remarks :—" There is no reason to believe that there has really been a decrease in the disease. Bacteriological examinations to ensure a correct diagnosis of enteric fever are only carried out in a small proportion of cases and the figure 0·18 cannot be said to accurately represent its incidence." High death rates were recorded in the towns of Myitkyina 1·1 p.m. and Sagaing 1·0.

Coorg.—Only 4 deaths were recorded.

Respiratory Diseases.

23. Table II (*xxxi*) gives the recorded deaths and rates *per mille* for British India and the provinces.

TABLE II (*xxxi*).

	Deaths.		Rate per mille.		
	1933.	1932.	1933.	1932.	1928-32.
British India	**443,305**	**405,924**	**1·6**	**1·5**	**1·5**
N.-W. F. P.	2,754	3,094	1	1	1
Punjab	55,337	60,251	2	3	2
Delhi	4,463	4,015	7	6	8
U. P.	34,898	33,730	1	1	1
B. and O.	6,295	5,582	..	..	..
Bengal	82,173	62,249	1	1	1
C. P.	32,134	30,411	2	1	3
Bombay	100,200	93,524	5	3	5
Madras	105,828	94,312	2	2	2
Coorg	179	264	1	2	2
Assam	5,444	5,358	..	1	1
Burma	12,043	11,830	1	1	1
Ajmer-Merwara	1,557	1,304	3	2	1

Table II (*xxxii*) gives the recorded deaths and rates p.m. by sex and in rural and urban areas in British India and in the provinces.

TABLE II (*xxxii*).

	Male.		Female.		Rural.		Urban.	
	Deaths.	Rate p.m.	Deaths.	Rate p.m.	Deaths.	Rate p.m.	Deaths.	Rate p.m.
British India	**248,320**	**1·8**	**194,985**	**1·5**	**307,516**	**1·2**	**135,789**	**5·1**
N.-W. F. P.	1,536	1	1,218	1	1,466	1	1,288	4
Punjab	30,695	2	24,642	2	42,032	2	13,305	4
Delhi	2,356	6	2,107	7	1,349	6	3,114	7
U. P.	18,240	1	16,658	1	8,212	...	26,686	7
B. and O.	3,557	...	2,738	...	5,365	...	930	1
Bengal	50,644	2	31,529	1	64,657	1	17,516	5
C. P.	19,014	2	13,120	2	26,998	2	5,136	3
Bombay	54,638	5	45,562	4	67,739	4	32,461	8
Madras	56,420	2	49,408	2	81,042	3	24,785	4
Coorg	133	1	46	1	47	...	132	14
Assam	3,255	1	2,189	1	5,032	1	412	2
Burma	7,021	1	5,022	1	3,558	...	8,485	6
Ajmer-Merwara	811	3	746	3	18	...	1,539	9

North-West Frontier Province.—The urban rate was nearly five times the rural rate. Rates varied between 7·7 p.m. in Haripur, 6·6 in Peshawar, 4·1 in Nawanshahr and 0·1 p.m. in Parang.

Punjab.—The provincial death rate was exceeded in 8 districts, the excess being most marked in Simla (11 p.m.), Ambala (6 p.m.), Kangra (6) and Amritsar (5). The maximum mortality occurred in January and the minimum in August.

United Provinces.—The continued high mortality in the districts of Hamirpur, Lucknow, Agra, and Cawnpore and the low rates in the districts of Mainpuri, Basti and Kheri, deserve more than passing attention. The mortality peak occurred in January and the minimum in July. The recorded urban rate was nearly 40 times higher than the rural rate. 3 towns did not record any deaths ; in 15 the deaths did not exceed 10 ; whilst the highest death rates were reported from Cawnpore 19 p.m. and Lucknow 14.

Bihar and Orissa.—Recorded death rates were high in the districts of the Orissa division, particularly in Puri and Sambalpur.

Bengal.—The mortality was highest in December and lowest in August. Compared with 1932 and the decennial mean, the monthly death rates were high throughout the year. As usual, Calcutta returned the highest mortality of the whole province. Other high figures were Jalpaiguri (5 p.m.), Howrah (4) and Hooghly (4). The urban rate was 12 times higher than the rural.

Central Provinces.—The mortality was highest in November and lowest in June. Jubbulpore district (8·5 p.m.) again recorded the highest mortality; other high rates were Saugor 5 p.m., Buldana 4 and Nimar 4.

Bombay Presidency.—The death rate under this heading is the highest after fevers and "other causes." The excess of 4 p.m. by which the urban death rate exceeds the rural was ascribed to congestion and better registration in the former areas. Of the total deaths, 10,665 were registered in Bombay city; 30,881 in the Central Registration district; 28,768 in Northern; 21,850 in Southern and 8,036 in Sind. The highest rural rates were registered in the districts of Kaira (8 p.m.), Surat (7), Ahmednagar (6) and Nasik (6). High urban rates were recorded in Viramgaon 18 p.m., Ahmednagar 14, Umarkot 14, Sholapur 13, etc.

Madras Presidency.—Recorded mortality from this group of diseases has increased steadily during the last decade. It was high in the colder months of January, November and December. As usual the Nilgiris district registered the highest death rate of 4 p.m. Other high death rates were Bellary 4 p.m. and Madura 3. The urban death rate was over 5 p.m. and that in rural towns about 2 p.m.

Assam.—Mortality was highest in December and lowest in July. Lakhimpur district continued to record the highest death rate and Goalpara the lowest.

Burma.—The maximum mortality occurred in December and the minimum in February. The urban rate was 18 times higher than the rural figure. Rangoon town (7 p.m.) recorded the highest death rate; the female death rate was 8 p.m. and the male 7 p.m.

Pneumonia.

24. *U. P.*—11,332 deaths were registered as due to pneumonia—10,814 in urban and 518 in rural areas, the corresponding death rates were 0·2, 2·9 and 0·01 p.m.

B. & O.—Pneumonia is one of the main causes responsible for the increased death rate from respiratory diseases.

Bengal.—37,337 deaths equivalent to a rate of 0·8 p.m. were recorded. Of these 31,403 deaths or 0·7 p.m. were in rural and 5,934 or 1·7 p.m. in urban areas. In Calcutta the deaths numbered 2,475 giving a rate of nearly 2 p.m.

Bombay Presidency.—Deaths totalled 22,552 giving a rate of 1 p.m. The urban death rate was 4 p.m. and the rural rate 1 p.m.

Assam.—207 deaths occurred in 13 municipalities and other towns in which registration of vital statistics is compulsory.

Burma.—3,747 deaths were recorded in urban areas, the death rate being 3 p.m.

Table II (xxxiii) gives death rates *per mille* for some of the larger towns :—

TABLE II (*xxxiii*).

	1933.	1932.		1933.	1932.
Delhi Province—			Hyderabad . . .	5	4
Delhi City . .	2	3	Poona	5	4
United Provinces—					
Lucknow . .	9	9	Ahmednagar . .	3	3
Agra . . .	11	8	Karachi . . .	7	6
Cawnpore . .	12	10	Nasik	5	4
Aligarh . . .	..	3	Ahmedabad . . .	2	4
Bengal Presidency—					
Howrah . . .	3	4	Coorg—		
Calcutta . . .	2	2	Mercara . . .	12	12
			Burma—		
			Rangoon . . .	4	4
Bombay Presidency—			Mandalay . .	3	3
Bombay . . .	6	6	Meiktila . . .	5	6

Tuberculosis.

(*a*) *General.*

25. The recorded statistics available from seven provinces show that tuberculosis is mainly an urban disease. Whilst 2% of the recorded deaths from all causes are due to tuberculosis of the lungs, nearly 5% were registered in urban and only about 1% in rural areas. This however is certainly an underestimate as in Delhi municipality for example, where registration is more accurate the number of deaths ascribed to phthisis was found on verification to be 850 in 1933 or nearly twice the figure actually reported by the ordinary agency. In urban areas where registration is less accurate, this difference is likely to be even greater, whilst in rural areas the situation is still worse. Tuberculosis is now almost certainly one of the main public health problems in India, ranking probably next to malaria in this respect. In fact, it may be regarded as an epidemic disease. Most western countries are said to have already passed through the epidemic stage,—the peak of the epidemic in England was reached as far back as 1830,—but it is difficult to state exactly at what stage the disease now is in India. Some hold that the peak has not yet been reached ; that India is still in the early stages ; and that the extent of tuberculisation of the population in India today is midway between that of the African races and the highly industrialised and urbanised European races. This view may or may not be correct but the fact remains that the disease is rampant. If one lays stress on the results obtained by the tuberculin test, the infection rate would seem to vary between 21% and 76% according to the density of population, giving an average of 46%. The bad housing conditions, the congestion and overcrowding, the unhygienic habits and customs of the people and the increasing urbanisation and industrialisation are without doubt conditions which predispose to rapid spread of infection, but the increasing interest in the disease, the earlier detection of cases and improved registration must be partly responsible for the increased figures. Social conditions, however, are pre-eminently suitable for spread of infection and the solution of the problem lies deep-rooted in the habits and customs of the people. No anti-tuberculosis campaign can hope to attain success if this fact is not constantly kept in mind.

Table II (xxxiv) gives figures of recorded deaths from tuberculosis of the lungs in urban and rural areas and their percentages to total deaths for those provinces where this disease is notifiable, but it is impossible to lay much stress on these figures as representing actual conditions.

TABLE II (*xxxiv*).

	Deaths from tubercle of lungs.			Percentage of total deaths.			Cases of tuberculosis estimated at 10 for each death.		
	Rural.	Urban.	Total.	R.	U.	T.	Rural.	Urban.	Total.
Delhi . . .	66	515	581	1	4	3	660	5,150	5,810
U. P. . . .	562	4,883	5,445	..	4	1	5,620	48,830	54,450
Bengal . . .	11,130	3,672	14,802	1	5	1	111,300	36,720	148,020
C. P. . . .	1,733	589	2,322	..	1	1	17,330	5,890	23,220
Bombay . .	15,422	7,101	22,523	4	7	4	154,220	71,010	225,230
Coorg . . .	3	2	5	..	..	..	30	20	50
Burma (urban) .	..	2,259	2,259	..	6	..	..	22,590	22,590
Total . . .	28,916	19,021	47,937	1	5	1	289,160	190,210	479,370

These figures do not confirm the view held by some that tuberculosis presents a more serious problem in rural areas than in the towns. Whilst it is probable that tuberculosis infection is more common in the ordinary village than available statistics would indicate, any one acquainted with rural life in India knows that, although sanitation is primitive and housing is of a low standard, men, women and children all live an active outdoor life and do not suffer from the overcrowding and ill-ventilation which is so common a feature in Indian cities and towns. These facts alone would go to indicate that tuberculosis infections cannot be anything like as ubiquitous in the rural areas as they are in the towns and there seems little reason to think otherwise. No doubt, the industrial workers of the cities are drawn from the village populations and those workers who fall victims to tuberculosis return to their villages when they find themselves no longer able to work, so that in certain areas from which industrial recruits are drawn there may be considerable numbers of active tuberculosis cases but this applies to very small parts of rural India and can have on the whole little influence on the tuberculosis rate in the general rural population of the country.

Notification of disease is an essential preliminary to any constructive measures for prevention and treatment and it is regrettable that little or no progress can be reported in this respect. In England and Wales as far back as 1907 the Local Government Board encouraged the voluntary notification of cases of pulmonary tuberculosis; in 1912 it was made compulsory. The position in India is one of marked contrast to that in England. So far there is no Ministry of Health as such; there is no Central Board of Health; and there is no general Public Health Act under which tuberculosis and other regulations might be framed. Sir George Newman in his Annual Report for 1933 on the state of public health in England and Wales very pertinently says :—

"The establishment of the Ministry of Health in 1919 had an important influence upon the prevention and treatment of tuberculosis. It inherited the responsibilities and functions previously exercised by the Local Government Board and the Insurance Commissioners, and was placed in close accord with the school medical services of the Board of Education, which established in 1907, had an important bearing on the prevention and treatment of tuberculosis in the child."

"The Ministry co-ordinated the public health services and brought them all to bear upon the prevention of disease, particularly tuberculosis. For the first time there was set up a special department of the Ministry concerned with tuberculosis, and central control became more unified and comprehensive in regard to it. The Public Health (Tuberculosis) Act of 1921 made the formulation of tuberculosis schemes compulsory, and devolved the provision of sanatorium treatment upon local authorities; it put an end to the artificial distinction between the insured and the uninsured tuberculosis patients.....
....."

"We cannot assign to one special factor or another in public health the credit for the general improvement observed, but statistics prove that all forms of tuberculosis are declining in our midst. In 1911, immediately prior to the setting up of the national scheme for combating tuberculosis, there were in England and Wales 38,422 deaths from tuberculosis of the respiratory system; a figure which in 1933 had declined to 27,854. The diminution in the deaths from other forms of tuberculosis within the same period is even more remarkable. In England and Wales, in 1911 these deaths were 14,698; in 1933 they had fallen to 5,405."

Since public health and disease prevention are "transferred" subjects, no *one* general policy is followed in India in regard to the prevention of tuberculosis. The P. H. C. with the Government of India has neither direct nor indirect control and the different provinces plan independently where they plan at all. The only All-India Organisation solely concerned with anti-tuberculosis work in India is the King George's Thanksgiving (Anti-tuberculosis) Fund. This organisation is ill-equipped financially and for this reason confines its activities mainly to propaganda work. The provincial municipal and other Acts do not include provisions for anti-tuberculosis work and will have to be amended before they can be made applicable; the position as regards rural areas is even worse.

Table II (xxxv) gives for the years 1931—33 the recorded deaths from tuberculosis of the lungs; the death rates *per mille*; and the percentages which these deaths bear to the total recorded deaths from respiratory diseases for the rural and urban areas in those provinces which furnish figures:—

TABLE II (*xxxv*).

	1931.			1932.			1933.		
	Deaths.	Rate p. m.	% of deaths from R. D.	Deaths.	Rate p. m.	% of deaths from R. D.	Deaths.	Rate p. m.	% of deaths from R. D.
Delhi—									
Rural	72	..	6	78	..	7	66	..	5
Urban	705	2	23	515	1	17	515	1	17
Total	777	1	18	593	1	15	581	1	13
U. P.—									
Rural	653	..	7	562	..	6	562	..	7
Urban	5,019	1	19	4,629	1	18	4,883	1	18
Total	5,672	..	15	5,191	..	15	5,445	..	16
Bengal—									
Rural	8,512	..	18	8,547	..	18	11,130	..	17
Urban	3,726	1	23	3,254	1	20	3,672	1	21
Total	12,238	..	20	11,801	..	19	14,802	..	18
C. P.—									
Rural	551	..	1	1,036	..	4	1,733	..	6
Urban	299	..	4	595	..	12	589	..	12
Total	850	..	2	1,631	..	5	2,322	..	7
Bombay—									
Rural	15,999	1	24	14,650	1	23	15,422	1	23
Urban	6,673	2	21	6,420	1	21	7,101	2	2
Total	22,672	1	23	21,070	1	22	22,523	1	23
Coorg—									
Rural	9	..	19	..	..	..	3	..	6
Urban	8	1	4	20	2	10	2	..	2
Total	17	..	7	20	..	8	5	..	3
Assam (13 larger towns)	78	..	..	73	..	18	90	..	21
Burma— Urban	2,015	1	24	2,104	1	25	2,259	2	27

R. D.—Respiratory Diseases.

Although mortality figures differentiated according to sex are not generally available, the fact that females are more severely infected than males is evident from the higher female death rates for respiratory diseases given in Table II (xxxii); other figures go to corroborate this conclusion.

Table II (xxxvi) gives the numbers of tuberculosis cases treated in hospitals and dispensaries, but these include only a fraction of the numbers actually infected.

TABLE II (*xxxvi*).

	1933.		1932.		1931.	
	Pulmonary.	Other types.	Pulmonary.	Other types.	Pulmonary.	Other types.
Total	**158,291**	**76,978**	**133,715**	**85,296**	**148,920**	**83,194**
N.-W. F. P.	5,760	4,100	3,669	3,443	3,837	3,000
Punjab	16,253	13,673	14,970	13,185	14,787	15,026
Delhi	4,210	4,441	3,455	3,368	2,939	3,829
U. P.	20,149	18,281	19,214	16,640	20,055	16,602
B. & O.	18,721	7,029	17,812	7,700	18,606	7,614
Bengal	24,730	7,077	21,949	7,324	20,411	6,133
C. P.	3,481	2,600	3,576	2,525	2,998	1,961
Bombay	15,516	8,524	933	10,426	16,720	9,877
Madras	41,171	18,728	40,896	18,210	40,743	16,478
Coorg	120	57	75	39	81	59
Assam	1,447	289	1,413	231	1,479	260
Burma	6,291	1,628	5,191	1,772	5,451	1,851
Baluchistan	442	551	562	433	813	509

(*b*) *Provincial.*

N.-W. F. P.—The scheme for the establishment of a sanatorium and a tuberculosis hospital at Haripur in Hazara district was still under consideration and it is hoped that this scheme will shortly bear fruit.

Punjab.—The disease is reported to be on the increase both in the urban and rural areas. The number of cases treated in hospitals and dispensaries rose from 14,970 in 1932 to 16,253. The I. G. C. H. remarks:—"The time has come for opening institutions for the treatment of tuberculosis at the headquarters of districts in the plains. The few sanatoria in the hills cannot hope to meet the needs of the province." The inquiry into the incidence of tuberculosis and the environmental and economic conditions associated therewith, started in 1932 in a suburb of Lahore town, was continued and 237 tubercular cases were detected. The dispensary opened last year continued to do useful work in the diagnosis of cases, their symptomatic treatment and in propaganda. Leaflets and charts on the prevention of the disease were distributed in schools, etc.

Delhi.—The incidence of pulmonary tuberculosis is said to be appreciably greater than that of the non-pulmonary types. In Table II (xxxvii) deaths from tuberculosis are given for 1933 by sex and communities. It is to be noted that the deaths among females are nearly double those among males.

TABLE II (*xxxvii*).

	M.	F.	Total.
All classes	326	603	929
Hindus	209	376	585
Muhammedans	116	220	336
Christians	1	7	8

The A. D. P. H. sums up the present position thus :—

" The appalling condition of Delhi city is having repercussions on the state of public health of New Delhi, Shahdara, Notified Area (Civil Lines) and Delhi. Already quite a number of deaths from pulmonary tuberculosis have been reported from these areas. Improving the general economic conditions of people, controlling the further increase of the population in an area which is already congested particularly the influx of the rural population—and making arrangements for better housing are all very important factors which are interconnected with each other and with the problem of the spread of tuberculosis.

But the unfortunate part of the problem is that many of these cases while they are still in the early stages of the disease, either do not know that they are infected, or are under a complete misapprehension, with the result that most of them become open cases, without having had an opportunity of being detected, while still in the early stage of the disease.

In order to deal with the problem from the medical point of view three things are essential and these are in order of priority as follows :—(1) Tuberculosis clinic and dispensary ; (2) tuberculosis sanatorium ; and (3) tuberculosis hospital. These problems are under the consideration of the Delhi Municipal Committee."

U. P.—The I. G. C. H. has some pertinent remarks to make on the problem. He says :—

" Tuberculosis of the lung is becoming steadily more prevalent. Remaining almost stationary between 1904 and 1914 it has since steadily progressed. From 8,689 cases in 1914 it has risen to 38,430 in 1933.

Conditions in fact are arising which make it extremely probable that there will be a widespread and devastating epidemic of tuberculosis in this province. It cannot be too strongly emphasized that tuberculosis is an epidemic disease. Because of the chronic nature of the disease this fact is often overlooked. We usually associate the term epidemic with diseases such as cholera, plague, etc., which are sudden in onset and short in duration, but other infectious diseases also become epidemic. Most western countries have passed through the epidemic stage of tuberculosis and all that is left is anendemic residue. The peak of the epidemic in England was as far back as 1830 and as recent as 1910 in Japan. So far as observations go India has not yet reached the peak but is still in the early stages.

There are hopes that a vaccine may soon be developed which will confer immunity. Till this happens the best measures are general measures improving the economic and social conditions of the population. As specific measures the tuberculosis dispensary is the only one financially possible."

B. & O.—The incidence of tuberculosis is reported to be increasing in the larger towns. Of the total cases treated in hospitals and dispensaries, 3,991 were in Patna district, 3,369 in Saran, 1,463 in Monghyr, 1,309 in Purnea, 1,213 in Santal Parganas, 1,093 in Shahabad, 1,029 in Muzaffarpur and 1,002 in Gaya. The Itki Sanatorium, established by Government for the treatment of early cases admitted 109 patients, including 65 new cases.

Bengal.—3,001 more deaths were recorded for phthisis than in 1932,—2,583 in rural areas, 315 in Calcutta and 103 in other urban areas ; these have increased the provincial death rate by 30% ; and those of rural and urban areas by 33% and 13% respectively. The death rate of Calcutta (2·2 p.m.) is the highest in the Presidency and has risen by 14%. The Jadabpur tuberculosis hospital treated 187 tubercular cases.

C. P.—Deaths from tuberculosis increased from 2,412 in 1932 to 3,212. Of these 2,322 were due to tuberculosis of the lungs and 890 to tuberculosis of joints. The district of Nagpur reported the largest number (570 deaths). The rural and urban death rates were 0·2 p.m. and 0·5 p.m. 3,481 cases of tuberculosis of the lungs and 2,600 of other tubercular disease were treated in hospitals and dispensaries. The Nirmalendu tuberculosis sanatorium treated 15 old and 46 new cases; of these 4 died and 38 were cured. 1,040 patients were treated in the tuberculosis ward in the Mayo Hospital, Nagpur.

Bombay Presidency.—As regards rural areas, the incidence of tuberculosis continued to be high in the Konkan owing to the proximity of this district to Bombay city and to the fact that it supplies a large part of the labour forces employed there. Owing to the return home of infected persons from Bombay city, high rural death rates continued to be recorded in the districts of Kolaba (2·9 p.m.), Ratnagiri (1·9), Kaira (1·9) and Thana (1·5).

The Presidency has 6 sanatoria :—(i) Turner Sanatorium, Bhoiwada Hill, Bombay city (32 beds); (ii) Bhadurjee Sanatorium, Deolali (28 beds); (iii) Hindu Sanatorium, Karla (40 beds); (iv) Bel-air Sanatorium, Panchgani (90 beds); (v) Hillside Sanatorium, Vengurla (25 beds); and (vi) Wanless Tuberculosis Sanatorium near Miraj (50 beds). In addition to the Turner Sanatorium, the Bombay Municipality continued to maintain 2 outdoor dispensaries for tubercular patients, one at the Sanitary Institute, Princess Street and the other at Foras Road. 1,127 pulmonary cases and 175 other types of tuberculosis were treated at these dispensaries; of these 997 were under 30 years of age; classified according to race the figures were 549 Hindus, 572 Muhammedans, 20 Parsees, 137 Christians and 24 Jews. The municipal tuberculosis dispensary in Karachi city treated 37,448 including 692 new cases. The 2 lady health visitors attached to this dispensary detected 657 suspicious cases of which 381 were found to be suffering from tuberculosis. In Hyderabad town (Sind) 1,409 cases were admitted into the K. T. tuberculosis dispensary.

Madras Presidency.—817 in-patients were treated in the tuberculosis hospital, Madras city and 8,391 outpatients in the Tuberculosis Institute, Madras. A tuberculosis survey of the lower staff of the Government Press, Madras, conducted in 1932, by the Director, Government Tuberculosis Institute, did not disclose any extraordinary prevalence of active tuberculosis amongst these workers. The daily average number of patients treated in the tuberculosis hospital, Madras, is said to have steadily increased. The incidence is reported to be high between the ages of 25-34 years and 15-24 years. Detailed returns of vital statistics submitted by health officers of 15 municipalities give a total of 2,141 deaths of tuberculosis of lungs; 1 among those aged between 1-5 years; 9 between 5-10 years; 37 between 10-15 years; 155 between 15-20 years; 635 between 20-30 years; 519 between 30-40 years; 412 between 40-50 years; 259 between 50-60 years; and 114 among those aged 60 years and upwards.

Assam.—The I. G. C. H. reports that tuberculosis of lungs is very prevalent in Sylhet district where 366 cases with 6 deaths were treated in hospitals and dispensaries.

Burma.—Urban death rates were high in Thamaing (3·9 p.m.), Myaungmya (3·9), Yenangyaung (3·5) and Paungde (3·2). Rangoon town reported 763 deaths and Mandalay (287).

Table II (xxxviii) gives figures for a number of towns where high death rates from tuberculosis of the lungs were recorded.

TABLE II (*xxxviii*).

	Death rate p.m. 1933.	Death rate p.m. 1932.
Delhi Province—		
Delhi City	1	1
United Provinces—		
Cawnpore	3	4
Lucknow	3	2
Agra	2	2
Farrukhabad	1	2
Benares	2	2
Bareilly	2	3
Allahabad	2	2
Bengal—		
Calcutta	2	2
Howrah	1	1
Dacca	1	3
Bombay Presidency—		
Bombay	1	1
Ahmedabad	3	3
Surat	3	2
Ahmednagar	2	1
Poona	3	3
Nasik	3	3
Karachi	2	2
Hyderabad	2	2
Burma—		
Rangoon	2	2
Myaungmya	4	2
Mandalay	2	2
Meiktila	2	1
Yenangyaung	3	3
Pegu	2	2

Beri-beri.

26. Table II (xxxix) gives the number of cases treated in hospitals and dispensaries in British India and in the various provinces during 1931, 1932 and 1933. These figures do not give any accurate estimation of the true incidence of the disease in the general population, but even so they once more differentiate clearly the main rice growing provinces from those where rice is not the staple article of diet.

TABLE II (*xxxix*).

	1931. Cases.	1931. Deaths.	1932. Cases.	1932. Deaths.	1933. Cases.	1933. Deaths.
Total	16,966	182	28,126	253	27,583	178
N. W. F. P.	..	..	..	..	..	..
Punjab	1	..	25	..	25	..
Delhi	46	..	19	..	41	..
U. P.	82	1	116	..	122	..
B. & O.	387	2	704	1	280	1
Bengal	3,203	14	8,683	47	4,078	12
C. P.	43	1	7	..	5	..
Bombay	23	..	60	2	14	..
Madras	11,593	50	16,756	96	21,335	57
Assam	162	2	192	..	125	1
Burma	1,426	112	1,564	107	1,557	107
Baluchistan	..	..	..	..	1	..

B. & O.—Hospital returns show that the highest incidence occurred in the districts of Singhbhum (77 cases), Patna (40), and Bhagalpur (39).

Bengal.—The incidence was lower but as in previous years the disease was confined chiefly to Calcutta with 1,624 cases and the Presidency division with 1,231 cases. In the Chittagong and Rajshahi divisions the infection was as usual slight, the cases numbering 57 and 71, respectively. Other divisional figures were Dacca 590 cases and Burdwan 505.

C. P.—Only 5 cases were recorded.

Madras Presidency.—As in previous years, the districts of Kistna (5,889), East Godavari (4,827), Guntur (3,477), Vizagapatam (3,420) and West Godavari (1,823) reported the largest numbers of cases treated.

Assam.—Of the total, 75 cases occurred in the Khasi and Jaintia Hills.

Burma.—The disease is not notified in rural areas but it is said to be rife amongst the *Mahoots* in the forest tracts in Toungoo district. 11 sporadic cases were reported in Kyaukpyu district and a few in the Kengtung State in the Southern Shan States at the end of the monsoon period, where the district health officer ascribed the disease to the consumption of old grain affected by dampness ; the cases ceased to occur with the use of newly harvested grain.

In the urban areas, where registration is fairly reliable, the recorded deaths numbered 26. In Mergui, most of the cases occurred amongst the cooly population in the rubber estates and tin mines and the Andhra community suffered most. Many health officers associate the disease with the consumption of damp and deteriorated rice. In Henzada, the use of a special brand of mustard oil was said to be associated with its incidence ; cases began to recover when put on a diet rich in vitamin B.

Ankylostomiasis.

27. Table II (xl) gives the numbers of cases treated in British India and in the different provinces. Much the highest number was as usual recorded in the Madras Presidency.

TABLE II (*xl*).

	1931.		1932.		1933.	
	Cases.	Rate per 10,000 of total.	Cases.	Rate per 10,000 of total.	Cases.	Rate per 10,000 of total.
Total	**193,013**	**26·7**	**152,972**	**20·8**	**164,480**	**22·0**
N. W. F. P.	320	2	426	2	661	3
Punjab	1,567	1	1,976	1	2,296	1
Delhi	94	1	103	1	59	..
U. P.	1,276	2	1,200	1	1,414	2
B. & O.	21,481	28	19,439	27	18,000	25
Bengal	6,069	6	4,351	5	4,544	4
C. P.	541	1	97	..	309	1
Bombay	407	1	1,127	2	388	1
Madras	159,045	10	122,405	76	131,258	79
Coorg	..	..	..	..	3,463	120
Assam	857	4	901	4	930	4
Burma	1,356	5	945	3	1,152	3
Baluchistan	9	..	2	..	6	..

Punjab.—Surveys of 46 villages definitely confirmed the existence of hookworm infection in Shakargarh *tehsil* in Gurdaspur district situated at the foot of the hills. Out of 11,109 stools examined 81% were found positive for hookworm ova and the incidence rate was found to vary between 57% to 96%. A scheme for mass treatment was sanctioned.

C. P.—Further investigations into the prevalence and treatment of hookworm were carried out in Nagpur, Jubbulpore, Raipur, Narsinghpur, Akola and Amraoti jails ; no details are available.

Madras Presidency.—The rural sanitation campaign continued its anti-hookworm activities. The 6 units were at work in the rural development area at Tiruvallur and in the districts of East Godavari, Madura, Coimbatore, Salem and Vizagapatam. As in previous years, this campaign concentrated on propaganda, the prevention of soil pollution, mass treatment and the provision of village latrines. In Tiruvallur, 1,730 specimens of faeces were examined for hookworm eggs and 90% of the population was found infected ; the intensity of infection as determined by egg counts was on the average 690 eggs per gramme of faeces.

Cinema shows, lantern lectures and talks were given to audiences totalling over 5 lakhs. Pamphlets and bulletins were distributed free. A total of 218,143 treatments for hookworm were given, these including 10,722 given by the rural sanitation staff and 143,278 by medical institutions. 1,572 new latrines were constructed, mainly in Madura where the district board spent Rs. 23,310. Other district boards which assisted in the construction of latrines were Coimbatore (Rs. 10,093), Salem (Rs. 6,625), Vizagapatam (Rs. 5,355), Ramnad (Rs. 5,000), South Arcot (Rs. 2,500), Kistna (Rs. 1,630), Chittoor (Rs. 1,350) and West Godavari (Rs. 1,198).

Leprosy.

28. Table II (xli) gives the number of cases treated in hospitals and dispensaries. The high rates recorded in Madras are a measure of the anti-leprosy campaign's activities in this province.

TABLE II (*xli*).

	Cases.			Rate per 10,000 of total hospital cases.		
	1931	1932	1933	1931	1932	1933
Total	68,776	81,083	93,603	9·5	11·0	12·5
N.-W. F. P.	30	54	94	..	..	..
Punjab	237	725	631	..	..	..
Delhi	81	63	53	1	1	..
U. P.	5,843	7,013	7,911	7	9	9
B. & O.	9,368	10,985	8,604	12	15	12
Bengal	4,503	5,593	6,135	5	6	6
C. P.	3,378	2,954	6,348	10	8	19
Bombay	3,789	3,712	3,423	7	7	9
Madras	38,661	46,749	55,665	25	29	33
Coorg	1	1	1	..	..	..
Assam	634	451	972	3	2	4
Burma	2,238	2,766	3,755	8	9	11
Baluchistan	13	17	11	..	..	..

N.-W. F. P.—The Indian Council of the B. E. L. R. A. continued its contribution of Rs. 550 for anti-leprosy work. 84 cases were treated in Peshawar district alone.

Punjab.—With funds provided by the B. E. L. R. A., survey work was continued in the districts of Kangra and Lahore. As the district of Kangra is the chief endemic area, the Medical Officer of the leper home at Palampur acted in addition to his duties as district leprosy officer. 970 villages in Kangra and 372 in Lahore, including the municipal towns of Lahore and Baghbanpura, were completely surveyed. In 52 localities, 143 cases in different stages were detected. Five new clinics were opened. The leper homes at Tarn Taran, Rawalpindi, Palampur, Ambala and Subathu, which continued to be maintained for the most part by Government grants, provided accommodation for 878 cases, under the management and control of missionary societies.

U. P.—Clinics exist in nearly every district and a survey officer has been appointed under the auspices of the B. E. L. R. A. The Shrimati Bhagwan Dei leper home was opened in Cawnpore, the local Government meeting two-thirds and the Municipal Board one-third of the recurring expenditure. The asylum at Roorkee was closed. The skin dispensaries at Cawnpore (292), Benares (339), Lucknow (363) under the control of the B. E. L. R. A. treated a total of 994 cases.

B. & O.—50 clinics were at work and treated 9,772 patients. The 6 asylums and 2 colonies, with accommodation for 2,079 cases, treated 2,273 in and 1,733 out-patients at a total cost of Rs. 1,66,506.

The Jharia Mines Board of Health allotted Rs. 1,500 for leprosy relief work. Clinics were held twice weekly at Jharia, Dhanbad and Katras ; the treatments given totalled 18,632.

Bengal.—1,585 cases were treated in the Calcutta general hospitals and 4,550 in *muffassal* institutions. In addition, 821 in and 628 out-patients were treated in the special hospitals at Gobra (Calcutta), Raniganj and Bankura. Of the in-patients 12 were recorded as cures and 65 died. The expenditure on the upkeep of these 3 institutions amounted to Rs. 86,069, of which Government contributed Rs. 61,499.

C. P.—The assistant medical officers, after special training at Raipur under the leprosy specialist, were put in charge of 14 residuary centres and 3 others did survey and propaganda work. A total of 4,473 new cases were detected as a result of re-surveys in the surrounding areas. The attendances at the residuary centres totalled 41,105 ; those at the 14 dispensary centres, including the leprosy fund centres, numbered 30,084. Symptom-free and improved cases numbered 259 and 770 respectively. The number of sub-centres increased from 24 to 28. The assistant medical officers on leprosy duty provided relief to 64,192 cases in 14 station-house areas and carried out 1,429 sedimentation and 1,921 Kahn's tests with 841 positive results. The 8 asylums treated a total of 2,257 cases, of which 1,665 were old and 592 new admissions ; and 535 were discharged or died ; and 1,442 were treated as outdoor cases.

This province has 10 assistant surgeons, 68 assistant medical officers and 16 private medical practitioners trained in modern methods of diagnosis and treatment.

Bombay Presidency.—Of the total, 1,431 cases were treated in the Deccan, 1,205 in the Konkan, 227 in Gujarat, 18 in Sind, 11 in the Persian Gulf, 18 in state special and railway institutions and 513 in private non-aided institutions.

Madras Presidency—The anti-leprosy campaign continued under the administrative control of the Surgeon-General. The appointment of the Chief Leprosy Officer was sanctioned for a further period to 1st May, 1935. At a conference of medical and social workers of the Madras leprosy campaign, the resolutions passed at the All-India leprosy conference held at Calcutta in March, 1933, were adopted and steps were being taken to bring them into effect. At the Calcutta conference it was resolved that leprosy relief measures should be treated as a purely public health problem, but in view of the present state of finances, it was decided to retain the control of the 330 clinics in this Presidency under the Medical Department, the Public Health Department assisting by surveys and health propaganda. The total attendance at these clinics was 695,295 and new cases numbered 44,622. Of the 55,501 lepers detected during surveys, 44,622 came under treatment. Government headquarters hospitals were included in the list of recognised treatment centres. To relieve the Chief Leprosy Officer of a substantial proportion of group leprosy work and to enable him to devote greater attention to consolidation and co-ordination of relief measures, it was decided to re-group the districts. District leprosy councils were formed in some districts; whilst in many others arrangements for the formation of such councils were in progress. Statistics of deaths from leprosy are not registered but in 15 of the larger municipalities, a total of 130 deaths were ascribed to this cause; of these 28 were aged 20—30 years, 23 between 30—40 years, 27 between 40—50 years, 28 between 50—60 years, and 21 were 60 years or above.

Assam.—With substantial grants for medicines and equipment from the Assam Leprosy Relief Committee the number of Public Health Department dispensaries for the treatment of leprosy increased to 45. A total of 2,089 cases were treated of which 581 were in Sylhet, 463 in Nowgong, 640 in Darrang, 348 in Kamrup, 31 in Sibsagar and 26 in Goalpara, whilst 2,050 cases attended hospitals and dispensaries. Surveys were continued. Out-patients clinics numbering 100 were available at all the *Sadr* and sub-divisional headquarters hospitals and at some of the important outlying dispensaries. A leper asylum with accommodation for 20 in-patients and an outdoor clinic was opened by the municipal board of Gauhati and the American Baptist Foreign Missionary Society started a colony at Jorhat where 46 cases were under treatment. 244 new cases were admitted to the leper asylum, Sylhet, the leper hospital, Kohima, the leper colony, Tura, and the leper ward, Dhubri. Two assistant surgeons of the Public Health Department received special training at Calcutta. The D. P. H. carried out leprosy inspections in the districts of Kamrup and Nowgong. Surveys were continued under the civil surgeons in the districts of Cachar, Nowgong, Lakhimpur, Sadiya Frontier Tract and Garo Hills and a total of 1,314 new cases were treated.

Burma.—Deaths totalled 225, giving a death rate of 0·2 p. m.; of these 72 deaths occurred in Rangoon, 35 in Mandalay and 22 in Moulmein. The special leprosy staff continued to work through the 10 clinics in the districts of Minbu and Meiktila and in Hlegu township. The leper colony committee, Minbu, started a leper colony. The Health Unit staff at Hlegu surveyed 47 villages and of the 4,230 persons examined, 88 or 2·1 % were found to be suffering from leprosy.

The leper hospitals at Rangoon, Moulmein and Mandalay continued to work satisfactorily.

Rabies and Hydrophobia.

29. Table II (*xlii*) gives the number of deaths from rabies in the rural and urban areas of British India and the provinces.

TABLE II (*xlii*).

	Deaths.			Deaths 1933.
	Rural.	Urban.	Total.	
Total	**2,326**	**358**	**2,684**	**2,453**
N.-W. F. P.	5	..	5	1
Punjab	129	30	159	130
Delhi	..	1	1	1
U. P.	496	55	551	361
B. & O.	154	18	172	157
Bengal	579	31	610	560
C. P.	176	25	201	174
Bombay	166	35	201	174
Madras	355	109	464	538
Coorg	..	..	..	..
Assam	46	4	50	54
Burma	220	50	270	303
Ajmer-Merwara	..	..	..	..

C. P.—Of the cases treated at various centres, Jubbulpore had 662, Nagpur 516, Hoshangabad 224, Akola 166 and Raipur 95. Out of a total of 833 dogbite or other bite cases recorded in municipalities and of 339 cases in rural areas, 663 and 346 respectively were sent for treatment; of these 714 survived and 3 died; the condition of the others was unknown.

Bombay.—Deaths among males numbered 137 and those among females 64 as against 124 and 50 in 1932.

Madras Presidency.—The D. P. H. writes:

"There is reason to believe that the number of deaths under rabies is an understatement, because it is a well known fact that few local bodies carry out effective measures to destroy unlicensed and street-dogs. Until a campaign against street-degs in general is carried out throughout the year in a systematic manner, there will be no chance of reducing the incidence of this disease."

Venereal Diseases.

30. Statistics of the incidence of "V. D." are not recorded for the general population; the only accurate returns are those of the British and Indian Armies and the jail population. Table II (*xliii*) shows the numbers of cases treated in hospitals and dispensaries in different provinces during the years 1932 and 1933 and these give some idea of the prevalence of "V. D." in the general population, although they relate to a selected group.

TABLE II (*xliii*).

	1932.				1933.			
	Gono-coccal infection.	Syphilis.	Total.	% of total.	Gono-coccal infection.	Syphilis.	Total.	% of total.
Total . .	**289,268**	**343,348**	**632,616**	**0·9**	**291,914**	**335,986**	**627,900**	**0·8**
N.-W. F. P. .	1,364	5,693	7,057	..	1,731	7,196	8,927	..
Punjab . .	13,608	18,446	32,054	..	13,472	18,178	31,650	..
Delhi . .	6,101	7,732	13,833	1	6,976	7,299	14,275	1
U. P. . .	25,566	38,700	64,266	1	27,343	40,280	67,623	1
B. & O. .	28,806	42,754	71,560	1	27,058	39,200	66,258	1
Bengal . .	48,025	35,921	83,946	1	48,024	35,916	83,940	1
C. P. . .	13,734	18,015	31,749	1	14,247	18,081	32,328	1
Bombay .	24,876	37,791	62,667	1	21,188	28,216	49,404	1
Madras . .	98,951	104,230	203,181	1	103,118	107,019	210,137	1
Coorg . .	353	202	555	..	311	168	479	..
Assam . .	4,951	2,265	7,216	..	4,743	2,234	6,977	..
Burma . .	22,144	30,524	52,668	2	23,140	31,652	54,792	2
Baluchistan .	789	1,075	1,864	..	563	547	1,110	..

Although India has not yet become a party to the Brussels' Agreement of 1924 which provides facilities for the free treatment of "V. D." among merchant seamen, this is not because of inaction as regards the provision of facilities at her major ports. As a matter of fact, treatment centres are in existence at Bombay, Karachi, Calcutta, Chittagong, Madras, Rangoon, Bassein and Moulmein and the arrangements made at these centres are listed below :—

Treatment Centres in India.

Treatment Centres.	Days and hours open.	Remarks.
	Calcutta.	
Presidency General Hospital.	9 to 11 A.M. 2 to 5 P.M. } Every day, Sundays excepted.	*Nil.*
Howrah General Hospital.	Out-patient department opens on Mondays and Tuesdays. Thursdays and Fridays from 10 A.M. onwards. Indoor—Day and night.	*Nil.*
	Chittagong.	
Chittagong General Hospital.	8 to 10 A.M. daily . .	Salvarsan injections every Wednesday. Bismuth injections every Saturday.
	Madras.	
Government General Hospital.	From 8 A.M. to 1 P.M. every day except Sunday. From 8 A.M. to 11 A.M. on Sunday.	

Treatment Centres.	Days and hours open.	Remarks.
	Bombay.	
J. J. Hospital (outdoor Department), Parel Road, Byculla.	9-30 A.M. to 11-30 A. M. daily.	
Municipal Anti-Venereal Clinic, 254 Bellasis Road, opposite Post Office, Byculla.	8 to 12 noon and 4 P. M. to 7 P. M. daily.	A prophylactic disinfection centre which is open day and night is also attached to this clinic.
King Edward VII Memorial Hospital, Parel.	8 A. M. to 10 A. M. daily.	
Gokuldas Tejpal Hospital, Carnak Road, Fort.	9 A M. to 12 noon daily.	
Yamunabai L. Nair Charitable Hospital, North Jetha Street, Lamington Road, Byculla.	8-30 A. M. to 9-30 A. M. daily.	
St. George's Hospital, Bori Bunder, Fort.	9 A. M. to 12 noon daily.	
Parsee General Hospital, B. Petit Road, Cumballa Hill.	9 A. M. to 12 noon daily.	
	Karachi.	
Civil Hospital, Karachi.	9 A. M. to 12 noon daily	This centre is situated at a distance from the port.
	Rangoon.	
General Hospital	Week days—7 A. M. to 12 noon. 3 P. M. to 5 P. M.	
	Bassein.	
General Hospital	Week days—8 A. M. to 11 A. M. 3 P. M. to 5 P. M.	
	Moulmein.	
General Hospital	Week days—8 A. M. to 12 noon. 3 P. M. to 5 P. M.	
	Akyab.	
General Hospital.	Week days—7-30 A. M. to 12 noon. 3 P. M. to 5 P. M.	

The following sub-paragraphs give additional information in regard to facilities for the treatment of "V. D." in the general population :—

Delhi.—The Delhi Municipality continued to arrange for free treatment at the civil hospital, Delhi city.

B. & O.—Government continued to make a special grant of Rs. 5,000 for the purchase of arsenical preparations for treatment at the *sadr* and subdivisional headquarter hospitals in charge of assistant surgeons.

Bengal.—The numbers treated in Calcutta and in mufassal institutions are given below :—

	Calcutta.		Mufassal.	
	M.	F.	M.	F.
Gonococcal infection . . .	11,076	4,196	26,079	6,673
Syphilis	9,559	4,774	16,006	5,577
Other V. D.	5,229	2,231	11,409	3,537
Total	25,864	11,201	53,494	15,787

C. P.—The treatment of venereal diseases at branch dispensaries is said to be "most unsatisfactory" due to the inadequacy of drugs and equipment. The question of improving the existing arrangements of treatment in Chhattisgarh division received attention. The largest number of cases were treated in the districts of Raipur (6,728), Bilaspur (3,509), Nagpur (3,969), Jubbulpore (2,461), Amraoti (1,885) and Akola (1,961).

Bombay Presidency.—Of the total, 6,967 cases of gonococcal infection and 6,273 of syphilis were treated in the Konkan, including 6,012 and 5,344, respectively in Bombay city ; 3,974 and 7,609 in the Deccan, including 1,097 and 1,899 in Dharwar district ; 1,776 and 1,360 in Ahmedabad ; and 3,443 and 5,403 in Sind, including 1,290 and 2,064 in Karachi. 5,028 cases of gonococcal infection and 6,600 of syphilis were reported from state special, railway and private non-aided and other institutions.

In Bombay city, the league for combating venereal diseases continued to maintain an information bureau and a clinic. 3,188 males and 527 females were treated at the clinic ; syphilis cases numbered 833, gonorrhœa 1,932 and non-syphilitic chancres 773. Stock gonococcal vaccines prepared from strains collected in the dispensary and autogenous vaccines of secondary organisms were prepared in the laboratory and used in the course of treatment.

Madras Presidency.—The venereal department of the Government General Hospital, Madras, in charge of a "V. D." specialist treated, on an average, 134 old and new cases daily.

Assam.—Gonococcal cases numbered 4,146 males and 597 females ; syphilis 1,794 and 440 ; other "V. D." 569 and 120. The anti-syphilitic campaign in the Naga and Lushai Hills was continued.

Burma.—These diseases are widespread in the Arakan Hill tracts ; in the Northern Shan States, gonorrhœa and syphilis are said to be fairly common ; whilst in the Kachin Hill tracts in Bhamo, the incidence was high.

In other provinces progress has not been reported.

Kala-azar.

31. In the concluding paragraphs of a paper* by Drs. L. E. Napier and K. V. Krishnan the position is summarised in these words :—

" It is thus apparent that in Madras the disease is truly endemic and not subject to much variation from year to year ; in Assam it is epidemic and disappears almost entirely from many places in the inter-epidemic period ; in Bengal the state of affairs is intermediate between these two extremes, it is endemic, more or less throughout the province, but is subject to periodic increases of incidence. Or to refer to the disease of a population as one would the disease of an individual—in Madras it is chronic, in Bengal sub-acute with periodic exacerbations, and in Assam it is acute with periodic relapses."

" When the disease is invading virgin soil, the mass immunity is low, the infection is easily established, and the disease is epidemic ; the clinical disease—the evidence of the fight between the parasite and host—is acute, there is little scope for host—parasite adjustment, and the result is a decisive victory on one side or the other. This was the state of affairs in the early Assam epidemics ; history relates that 95 % of patients died, the rest being completely cured. Amongst so small a number of surviving hosts, there would be a negligible number, if any, of examples of imperfect immunity response."

" With an increase in mass immunity in the population, which inevitably follows the subjection of a population to repeated epidemics, the disease will become endemic, it will assume a less acute symptomatology—the host-parasite battle will be less severe ; there will be more scope for host parasite adjustment, there will be a greater number of surviving hosts, and the examples of imperfect immunity response will begin to appear. This is the state of affairs that existed in Bengal up to about 15 years ago."

" With the further increase in mass immunity the chronic forms of the visceral disease appear, there are still more survivors and amongst these a greater number show evidence of imperfect immunity response, *i.e.*, dermal lesions ; this is the state of affairs which we believe exists in some rural endemic areas in Southern India to-day."

" Our conclusion is that in Southern India are the oldest foci of kala-azar as far as India is concerned, that here the disease has passed through the two stages now seen to exist in Assam and Bengal, respectively, and has reached a " chronic " stage where there is no rise and fall in incidence from year to year and the disease is truly endemic, and that the transmission is almost entirely from dermal infections, so that treatment of kala-azar cases alone does not affect the general incidence of the disease."

U. P.—Of a total of 504 recorded deaths, 401 were in rural and 103 in urban areas. These increased figures would seem to suggest that the disease is gaining ground in this province. Among rural districts, Fyzabad recorded 139 deaths, Gorakhpur 55 and Allahabad 94. In no other district did the number of deaths exceed 17.

B. & O.—A total of 55,044 cases were treated in hospitals and dispensaries. The disease is very prevalent in Bihar. District figures included Saran 11,553 cases, Darbhanga 9,895, Muzaffarpur 9,556, Purnea 8,775, Champaran 4,512, Patna 3,014, Monghyr 2,774 and Bhagalpur 2,630. The government grant for the purchase of special drugs for treatment was increased to Rs. 10,000 and distributed mainly among the *sadr* and sub-divisional hospitals in Bihar. The scheme for investigation of the spread of the disease referred to in the 1932 report has been dropped.

Bengal.—The recorded deaths increased to 13,447 and the death rate to 0·3 p.m. Of the 689 deaths in towns, Calcutta recorded 233. Compared with 1932, the urban death rate increased by 11 % ; in Calcutta it fell by 5 %. The rural districts of Tippera, Dinajpur and Dacca recorded 2,105, 1,946 and 1,325 deaths respectively. Infection in the Burdwan division was slight. Table II (*xliv*) gives the numbers of cases treated in hospitals and dispensaries in the different districts.

*Kala-azar in Madras and its bearing on epidemiology of the disease in India. Published in the I. J.M. R. Vol. XXI, No. 1, July, 1933.

TABLE II (*xliv*).

	1930.	1931.	1932.	1933.
Total	110,017	101,151	105,840	75,685
Rajshahi	11,675	9,681	11,026	8,092
Murshidabad	3,947	5,737	9,309	6,349
Malda	4,173	5,326	9,075	4,846
Dacca	5,403	5,980	7,290	5,318
24-Parganas	11,302	9,155	5,873	1,708
Khulna	3,724	4,813	5,717	3,593
Jessore	4,807	5,014	5,655	4,507
Nadia	6,824	6,549	5,415	4,178
Bakarganj	3,962	4,588	5,334	4,151
Tippera	4,638	5,334	5,015	3,709
Calcutta	6,922	6,322	4,764	5,373
Noakhali	3,011	2,726	4,663	2,890
Dinajpur	2,730	2,992	3,715	5,433
Rangpur	3,479	3,356	3,433	3,351
Faridpur	3,053	3,205	3,258	2,179
Mymensingh	4,620	3,621	3,181	2,870
Burdwan	3,340	3,407	2,373	1,892
Hooghly	3,760	3,249	2,339	1,285
Chittagong	1,411	1,751	1,780	903
Bogra	876	1,758	1,655	1,049
Pabna	2,376	2,748	1,496	514
Midnapore	1,179	1,258	1,097	165
Jalpaiguri	1,091	748	795	651
Howrah	1,207	955	765	743
Darjeeling	342	356	653	889
Bankura	100	138	101	71
Birbhum	64	54	63	74

Madras Presidency.—Of 6,024 cases treated in hospitals and dispensaries 2,235 were recorded in Tinnevelly district, 1,808 in Madras city, 1,010 in Malabar, 445 in Ramnad and 260 in Salem.

Assam.—Compared with 1932, the number of cases rose by 692 and that of recorded deaths decreased by 238. The D. P. H. commenting on this increase says—

> "Whether this small increase is due to more thorough surveys or to a periodic cycle remains yet to be seen. There is, however, no reason to be alarmed."

Throughout the province special attention continued to be paid to intensive and detailed surveys particularly in regard to the detection of new cases. Table II (*xlv*) gives the figures of recorded deaths and cases treated by the Public Health Department during the period 1927-33.

Other Provinces.—Only 106 cases were treated in the Punjab; in Burma 61; in C. P. 15; in Bombay Presidency 12; and in Baluchistan only 1. N. W. F. P. and Delhi had no cases.

TABLE II (*xlv*).

	Deaths.							Cases treated.						
	1933.	1932.	1931.	1930.	1929.	1928.	1927.	1933.	1932.	1931.	1930.	1929.	1928.	1927.
Total .	749	987	1,017	953	1,405	1,660	2,859	12,650	11,958	9,759	16,430	23,804	23,576	33,415
Cachar	2	4	4	2	3	2	12	472	391	285	376	470	394	359
Sylhet	146	296	246	274	429	482	798	4,210	4,719	4,017	6,726	9,162	8,988	10,527
Goalpara	92	122	121	112	135	166	226	1,159	1,089	741	1,439	2,389	2,316	3,495
Kamrup	129	152	160	102	180	241	475	1,223	2,061	1,430	1,814	2,598	3,577	6,445
Darrang	167	155	222	185	241	258	318	757	665	734	1,106	1,390	2,228	4,053
Nowgong	110	132	129	132	178	260	528	1,663	1,075	879	1,440	2,433	2,614	5,008
Sibsagar	64	78	71	58	87	86	143	1251	1,269	879	1,495	2,387	1,555	1,521
Lakhimpur	4	2	..	2	1	5	5	13	12	3	23	23	28	19
Khasi and Jaintia Hills . .	..	..	..	..	..	4	3	1	..	..	..	..	6	120
Naga Hills	1	1	..	1	1	..	..	12	16	5	21	9	5	1
Lushai Hills	..	1	..	..	..	1	..	1	2	..	..	..	1	..
Garo Hills	34	43	64	84	149	154	350	850	605	746	1,905	2,905	1,690	1,828
Sadiya Frontier Tract . . .	..	1	..	..	1	1	1	2	1	2	2	3	8	3
Manipur State	..	..	..	1	..	..	..	36	53	38	83	35	166	36

Relapsing fever.

32. True relapsing fever is not common in India as is generally evident from Table II (*xlvi*) which gives the numbers of cases reported from medical institutions in the different provinces. It has been pointed out that the large numbers recorded in Bengal are not true relapsing fever ; most of the so-called cases are probably due to malaria or other fevers in which relapses are a common feature. In an attempt to correct this error in registration it has been suggested to provincial P. H. Departments that the word " spirochaetal " should be inserted after the word " relapsing fever ". It remains to be seen if this will be sufficient to indicate to medical officers and others that relapsing fever is a definite disease.

TABLE II (*xlvi*).

	1933.	1932.
Total .	4,982	6,200
N. W. F. P.	20	33
Punjab	236	401
Delhi	23	18
U. P.	446	412
B. & O.	635	709
Bengal	2,078	3,053
C. P.	149	128
Bombay	103	184
Madras	1,221	1,141
Coorg	..	..
Assam	7	..
Burma	61	62
Baluchistan	3	59

N. W. F. P.—Nine cases were treated in D. I. Khan, 8 in Kurram Agency and 1 each in Hazara, Peshawar and Kohat.

Punjab.—Sporadic infection was reported in the districts of Amritsar, Sialkot and Montgomery, a total of 25 non-fatal cases being recorded. Hospital records show that 26 cases were treated in Multan ; 22 each in Hissar and Ambala ; 17 each in Lahore and Gujrat ; 15 each in Rohtak and Montgomery ; 80 in 15 other districts and 22 on railways.

U. P.—510 deaths were recorded, 449 in rural and 61 in urban areas, but judging from the data supplied by the verification agency, the actual incidence may be estimated at 740 deaths. Of the rural total, 191 occurred in Ballia and 169 in Nainital district. Among towns, Balrampur in Gonda district reported 25 deaths and Kashipur in Nainital district 15 deaths.

B. & O.—Hospital and dispensary returns indicated that the incidence was high in the districts of Patna (134 cases), Saran (102), Hazaribagh (74), Gaya (69), Muzaffarpur (51), Singhbhum 51 and Manbhum 46.

Bengal.—5,173 deaths were recorded of which 5,148 were in rural areas and 25 in towns. No death was reported in Calcutta. Of the total cases treated in hospitals and dispensaries, 41 were in Calcutta as against 643 in 1932. This large reduction would suggest that more care has been taken to make a correct diagnosis. Districts reporting high figures were Murshidabad 280 cases, 24-Parganas 275, Dacca 240, Hooghly 216, Faridpur 172, Burdwan 149, Rajshahi 139 and Pabna 101.

C. P.—Cases treated in hospitals and dispensaries totalled 149, of which 59 were in Wardha and 36 in Hoshangabad.

Bombay Presidency.—Only 1 death was recorded in Ahmedabad city. Of the 103 cases treated in hospitals and dispensaries, 57 were in Bombay city.

Madras Presidency.—Cases treated in hospitals and dispensaries included 218 in West Godavari district, 202 in Chingleput, 181 in Vizagapatam, 127 in Ganjam, 118 in East Godavari and 109 in Madras town.

Assam.—Seven cases were treated but some of these were said to be cases of black-water fever.

Burma.—61 cases were treated in hospitals and dispensaries.

Influenza.

33. Most of the influenza deaths during a mild epidemic are included under the convenient heading of " fevers " or are recorded under respiratory diseases, as death frequently results from complications of this nature. In Bengal influenza was widespread and increased death rates were recorded in most districts. Deaths numbered 5,223 of which 4,423 were in rural areas, 710 in Calcutta and 90 in other towns. In the C. P. also, the disease was generally prevalent; of the 58,163 cases treated in hospitals and dispensaries, 11,678 were reported in Nagpur district, 9,784 in Jubbulpore, 7,949 in Hoshangabad, 5,311 in Akola, 4,837 in Amraoti, 3,972 in Buldana, 3,629 in Yeotmal and 3,175 in Nimar district. In the U. P., in Burma (41 deaths) and in Assam (73 deaths) only sporadic cases were recorded; in the Punjab and Bombay Presidency the incidence was mild, 2,311 cases with 2 deaths being recorded in the former and 206 deaths in the latter, including 76 in Bombay city. In the Bombay Presidency, the type of the disease was mainly respiratory but some cases of the abdominal type were also recorded. In the Punjab, the cases were of the mild catarrhal type.

Yaws.

34. *Madras.*—The disease is reported to be prevalent in certain areas of the Presidency and among certain tribes, *e.g.*, the Koyas in the Godavari Agency, the Chenchus in North Kurnool and in certain parts of Malabar, Coimbatore, Salem and in the Vizagapatam Agency.

Assam.—This disease is widely distributed in the lowlying hills and adjacent plains. During the year 714 cases were treated in Kamrup district, the *Rabhas*, *Kacharis*, Garos and Khasis inhabiting the sub-montane areas being chiefly affected. In the Nowgong district, 334 were treated in Public Health Department dispensaries and 260 cases in those of the Medical Department. Numerous cases were also detected and treated in the course of surveys in Goalpara district; at one centre 167 cases were treated.

Burma.—188 cases were treated in Tavoy district, 334 in Mergui, 160 in Mandalay specially in Singu township. In the Lower Chindwin district, the disease is prevalent in the Kani township and to a lesser extent in Yinmabin and Budalin townships. In the Chin Hills, it was on the decline in Falam and Tiddim sub-divisions but in Haka sub-division many cases were still in evidence. Cases were also reported from Thabeitkyin township.

Goitre.

35. *Burma*.—The disease is said to be prevalent in the hill tracts bounding the watersheds of the Irrawaddy, Chindwin Salween and Sittaung rivers. It is also common in some villages in Pyinmana township and in the township of Yamethin, Salin and Leiktho.

Guineaworm.

36. *C. P.*—65 cases were treated in hospitals and dispensaries. The disease was widespread in the Damoh sub-division and Akola districts; recorded cases included 42 in Saugor and 15 in Akola.

Diphtheria.

37. *Punjab*.—Sporadic cases continued to occur especially in the hills and northern districts. Altogether 134 cases with 54 deaths were reported, including Rawalpindi district 29 cases with 20 deaths, Jhelum 36 cases with 16 deaths, Lahore 23 and 5, Simla 15 and 3, Ludhiana and Lyallpur each 7 and 1, Mianwali 6 and 4, Amritsar 6 and 1, Montgomery 2 and 2, Attock 2 and 1 and Gurdaspur 1 case only.

The D.P.H. reports on the spread of the disease in Rawalpindi as follows :—

"In Murree hills diphtheria appeared in the Royal Air Force Colony where an Englishman, who had received infected papers from home, fell sick. People from the adjoining villages, serving this colony as labourers, carried the disease to their homes and in the village of Gehl 9 cases and 3 deaths occurred. A little later the villages of Masot and Chatra Dunga were also infected."

Delhi.—Only 2 deaths were reported.

Bengal.—In Calcutta, 310 cases were treated in the Medical College hospitals (indoor 305 and outdoor 5) and among these 101 deaths occurred. The Presidency General Hospital treated 33 inpatients, the Campbell Hospital 2, the Mayo Hospital 1 and the Sree Vishudhananda Saraswati Marwari Hospital 4 cases.

C. P.—49 cases with 3 deaths were reported, 29 in Jubbulpore, 11 in Saugor, 5 in Nagpur, 3 in Bilaspur and 1 in Bhandara.

Bombay Presidency.—114 cases with 22 deaths were reported in Karachi town and of the 102 cases treated in the municipal epidemic diseases hospital 21 died. Inoculation of school children and contacts was carried out.

Burma.—Deaths in towns where the disease is notified totalled 20, including Rangoon 11, Mandalay 5, Maubin 2 and Bassein and Moulmein 1 each.

Typhus Fever.

38. *Punjab*.—Five deaths were recorded in Kasur town in Lahore district.

In concluding a paper entitled "Review of fevers of the typhus group (vector unknown) occurring at Ahmednagar during 1933", Captain Basil Blewitt*, R. A. M. C. writes :—

"(I) The rate incidence of these typhus like fevers caused by an unknown vector is on the increase, and their importance from the Army medical stand point cannot be overestimated in view of the prolonged period during which the soldier is incapacitated from any duties, with the possibility of his never becoming fit for general service and his ultimate discharge on medical grounds.

* Journal of the Royal Army Medical Corps, December 1934, Volume LXIII.

(II) Apart from the greater exposure to infection in the cold weather, the evidence is definitely in favour of a seasonal incidence, suggesting a seasonal infectivity of the vector.

(III) The evidence is strongly in favour of the tick as the vector, human contact with the vector occurring when circumstances favour an unusually close proximity to tick infested cattle, which occurs: (1) within cantonments during and after the rains when the sale of grazing rights, both public and private, occurs; and (2) out of cantonments on manœuvers or during private parties during the period of seasonal infectivity, when camps are pitched on sites which attract herds of cattle and human beings.

(IV) An immunity would appear to exist among natives in an endemic area, as enquiries in the native villages and from the mission doctors in the area failed to elicit any history of such fevers.

(V) An incubation period of sixteen days on the average exists, followed by a prodromal phase of twenty four to forty-eight hours.

(VI) The fever is characterised by: (1) pyrexia of a swinging type lasting sixteen days on the average; (2) a generalized rash consisting of two elements, roseolar papulo-macules appearing on the third or fourth day and petechiae appearing on the sixth or seventh day, both elements invading the palms of the hands and soles of the feet; (3) dengue fever symptoms, *i.e.*, joint pains and myalgia, occur; (4) positive Weil-Felix reactions commencing either in the second or third week, and persisting for eight or nine weeks; (5) positive Wassermann reaction in 75 per cent. of the cases in the third week, 80 per cent. in the fourth; by the sixth week all are negative".

Cerebrospinal fever.

39. A note on this disease will be found in Section XII, Page 291.

Trachoma.

40. *Delhi Province.*—Trachoma is said to be very prevalent in this province but owing to defective registration cases are included unde 1 "other eye diseases". Trachoma cases treated in hospitals and dispensaries numbered 19,656 or 18 % of the total for eye diseases as against 13,926 or 17 % in 1932. During a survey of the rural areas in April 1934, 703 blind persons were detected (350 male and 353 female) as against the census (1931) figure of 656 for the whole province. This gives a rate of 3 to 4 blind persons per 1,000 of the rural population.

Table II (xlvii) gives the causes of blindness by classes and sex.

TABLE II (*xlvii*).

	Hindus.		Mohammedans.		Christians.		Total.	
	M.	F.	M.	F.	M.	F.	M.	F.
Cogenital .	10	9	1	3	..	..	11	12
Cataract .	41	35	6	9	..	1	47	45
Glaucoma .	13	7	2	1	..	..	15	8
Injuries .	16	9	2	2	..	..	18	11
Old age .	77	66	10	12	..	..	87	78
Other eye diseases.	62	94	8	20		..	70	114
Smallpox .	40	33	3	2	..	..	43	35
Syphilis .	1	..	1	..	..	..	2	..
Trachoma .	50	42	7	8	..	..	57	50
Total .	310	295	40	57	..	1	350	353

Of the total 154 were under 40 years of age, 33 under 10 years ; 43 aged between 10-20 years ; 28 between 20-30 years ; 50 between 30-40 years.

B. & O.—A campaign against the occurrence of preventible eye diseases leading to defective vision and total blindness was carried out by the M. O. Hs. of Gaya district and Patna city. Two eye clinics were opened in Patna city which were attended by 75 mild cases, serious cases being referred to the General Hospital. Case histories of the inmates of the blind school were examined and their defects were traceable to trachoma and corneal ulcer (7 cases), smallpox (5), ophthalmia neonatorum (3), typhoid (2), malaria (2) and dysentery (1) 17 cases of blindness were also examined in Aurangabad subdivision by the district M. O. H. of Gaya with similar findings.

Of the 6,719 school boys found with defects, 2·6 % were found suffering from common eye diseases, *e.g.*, trachoma, conjunctivities, blepharitis and corneal opacity, whilst 12·3 % had visual defects due chiefly to errors of refraction.

Assam.—A total of 3,603 minor eye complaints were treated at the Public Health Department dispensaries.

Lead Poisoning.

41. *Burma.*—No case of lead intoxication was recorded among the employees of the Burma Corporation, Namtu. One woman employed in the copper plant showed signs of lead absorption. Examination of the staff in the Burma Railways workshop at Myitnge proved that a number of those associated with lead presented evidence of excessive lead absorption. In order to lessen the risk, cowls with high chimneys were erected in the electric shops and glass screens were provided to prevent inhalation of the fumes where oxide of lead was being mixed. Facilities were also provided to enable workmen to wash their hands before eating.

Deaths in Mysore State.

42. Deaths from plague numbered 6,984, smallpox 2,801, cholera 90, fevers 51,370, dysentery and diarrhœa 4,824, respiratory diseases 3,314, injuries 1,229 and other causes 35,397. Of the total plague deaths, 5,017 or 72 % were recorded in the districts of Mysore (2,060), Chitaldrug (1,866) and Bangalore (1,087), the peak incidence occurring in September and the minimum in May. Smallpox mortality was high in April and low in November. Cholera was practically absent. The increase under fevers over the previous year was due chiefly to an epidemic of influenza in the Chitaldrug district. The leper asylum, Bangalore, treated 179 cases of leprosy, including 95 new admissions.

SECTION III.

MATERNITY AND CHILD WELFARE.*

(a) Maternal Mortality.

43. The columns given below indicate the present position, as revealed by the returns, with regard to deaths of women in child-birth. Appendix III (Table A) on page 344 gives maternal death rates for a number of towns in different provinces.

	1933.		1932.		1931.		1930.		1929.	
	Deaths.	Rate p.m.	Deaths.	Rate p.m.	Deaths.	Rate p.m.	Deaths.	Rate p.m.	Deaths.	Rate p.m.
Delhi—										
Rural	28	3·0	26†	2·7	20	2·1	31	3·8	Not available.	
Urban	165	9·0	63†	3·4	97	5·6	87	5·3		
Total	193	7·0	158‡	5·6	117	4·4	118	4·8		
U. P.—										
Rural	718	0·4	598	0·4	771	0·5	804	0·5	758	0·5
Urban	1,167	6·0	1,366	7·8	1,281	7·5	1,159	7·7	1,189	8·3
Total	1,885	1·0	1,964	1·2	2,058	1·2	1,963	1·2	1,947	1·2
Bengal—										
Rural	13,570	9·7	10,928	8·7	10,103	7·7	8,983	7·6	9,168	7·1
Urban	658	8·8	597	8·5	584	8·0	532	8·4	602	8·9
Total	14,228	9·7	11,525	8·7	10,687	7·7	9,515	7·7	9,770	7·2
C. P.—										
Rural	2,771	4·5	3,333	5·3	4,152	6·7	3,112	5·2	3,188	5·8
Urban	686	9·0	748	9·8	887	12·2	726	10·9	671	10·4
Total	3,457	5·0	4,081	5·8	5,039	7·3	3,838	5·8	3,859	6·3
Bombay—										
Rural	3,309	5·1	3,003	4·6	3,916	6·0	3,286	5·5	3,566	5·8
Urban	1,302	9·3	1,178	8·8	1,400	10·7	1,315	10·9	1,421	12·1
Total	4,611	5·8	4,181	5·3	5,316	7·0	4,601	6·4	4,987	6·8
Madras—										
Rural	11,581	7·3	9,876	7·0	12,293	8·3	9,880	6·9	8,593	6·3
Urban	1,984	13·5	2,713	12·1	1,872	14·3	2,761	13·7	2,494	12·9
Total	13,565	7·9	12,589	7·7	14,165	8·7	12,641	7·8	11,087	7·1
Coorg—										
Rural	57	15·4	59	15·0	87	23·8	57	16·0	46	13·7
Urban	2	6·0	...	...	1	2·9	2	7·0	2	7·3
Total	59	15·0	59	13·7	88	22·0	59	15·3	48	13·3
Assam—										
Towns over 10,000 and some others.	87	17·0	97	19·8	69	15·7	72	17·0	73	18·1
Burma—										
Urban	427	9·2	435	9·9	435	10·4	379	9·5	434	10·9

These figures cannot of course be taken at their face value. Were this done, India would be able to congratulate herself on a maternal mortality

*The notes for this section were again kindly supplied by Dr. Ruth Young, O.B.E., W.M.S. Director, Maternity and Child Welfare Bureau, Indian Red Cross Society.

† Number reported by the ordinary agency.

‡ Number reported on verification of causes of death.

rate which, in view of the conditions in the country, might be regarded as fairly satisfactory in quite a number of provinces. The real truth is quite otherwise as an examination of even the figures themselves will show. In six provinces the rates for urban areas are all higher than those for rural areas. It is not possible to conclude that these figures represent the actual position. While it is true that environmental hygiene may be better in rural areas on account of the absence of overcrowding, less observance of " purdah " and, perhaps, a better diet since milk and vegetables may be available, on the other hand, it is common knowledge that in villages there is practically complete absence of skilled aid at the time of child-birth and that must of necessity lead to maternal deaths. In urban areas, there are now a certain number of hospitals and trained midwives and a growing willingness on the part of the public to take advantage of these facilities. If we were to assume that the advantages in hygiene of rural life were counterbalanced by the presence of skilled aid in delivery cases, the two sets of figures might be expected to be about the same, especially as the people are of the same racial stocks for the most part. The figure of 0·4 deaths *per mille* in rural areas in the United Provinces cannot be regarded as anything but grotesque. The discrepancy elsewhere is not so striking, but it is still very noticeable.

The explanation is of course the faulty registration which has been referred to frequently in past reports. The absence of accurate registration makes it impossible to ascertain the real degree of maternal mortality in India. In the Madras Presidency, where an investigation was carried out a few years ago, the rate was considerably higher than that given in the tables. Were the causes of death checked it would certainly be found that the cases of death due to child-birth were far higher than the figures indicated. Probably everywhere a number of actual deaths escape registration, but in addition causes of death are not reported accurately and this inaccuracy is more liable to be present here than in the case of epidemic diseases such as plague, cholera or smallpox. Since the registration is less faulty in urban than in rural areas, the death rates appear higher in the former but it is improbable that this is actually the case.

Some idea of the causes of death may be gathered from the reports of certain hospitals for women summarised in the Journal of the Association for Medical Women in India (August 1934). The figures relate to the year 1933. The rate of death per 1,000 cases admitted in these hospitals was 24 p.m. That for the Government Hospital for Women and Children, Madras, was 22. For comparative purposes the statistics of the St. Mary's Hospital, Manchester, are shown along with these figures. The death rate in Manchester was 9 per thousand cases. The rate would naturally be less in England even among cases admitted to hospitals. What is significant is the cause of the great proportion of the deaths in India compared with those at Manchester. Anæmia, eclampsia and puerperal sepsis account for deaths in a manner out of all proportion to these causes in the English figures. Hæmorrhages are the next most potent cause of loss of life. These deaths are in the majority of cases preventible and could be prevented if India had an adequate maternity service. Even in the capital city where there are three good women's hospitals and a large number of trained midwives and health visitors, the reported deaths from sepsis were 18 and those from eclampsia 10. In the city of Madras, boasting one of the finest maternity hospitals in the world besides several other good hospitals for women, the maternal mortality rate was 12 per 1,000 and 54 % of these deaths were said to be due to puerperal sepsis. In the city of Bombay 45 % of deliveries are conducted in hospital and 24 % by qualified nurses, leaving only 29 % to be

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attended by unqualified persons. The maternal mortality for the city is 8 per thousand. The figure for Calcutta is not available, but since fewer deliveries take place in that city than in either Madras or Bombay the probability is that there it is even higher.

In view of the absence of reliable statistics, it is impossible to state how many women in India die yearly during child-birth, but the number must be nearly one and a half lakhs, excluding deaths from complications of abortion which would swell the number still further. An epidemic disease assuming these proportions demands and receives attention from local authorities, health departments and the public itself. Deaths of women from preventible causes do not appear to receive the same attention. The explanation may be partly that the facts are not known sufficiently, partly because mortality from child-bearing does not occur in epidemic form, but it must also be due to the too commonly held view that it is inevitable that some women must die during child-birth. "Some women" in each area naturally become thousands when applied to the whole of India.

(b) Maternity Work and Midwives Training.

44. The maternal mortality rate is not likely to be reduced to any extent until the maternity service is improved. The problems involved in securing such improvement have been mentioned each year in this report, and the position does not seem to alter materially from year to year. Over a space of time, however, it is evident that slow progress has been made. The number of women who go to hospitals for delivery has certainly much increased, the Bombay figures being particularly striking. In urban areas, accommodation for maternity cases is often insufficient to meet the demands made on existing hospitals. Maternity homes, especially in Western India, are springing up. In towns also the services of trained midwives are in greater demand. This is so far satisfactory, but could the pace not be accelerated ? With regard to urban areas it certainly could be. Municipal committees have the power and the opportunity to make advance and keen medical officers of health should stimulate their councils and committees to wipe out the disgrace of unnecessary loss of life occurring daily in the cities and towns of India. It seems possible that progress could be made in the following ways.

(i) The greater number of trained midwives now available makes it possible for committees to be stricter than formerly as to the qualifications of those practising in a given area. There is no longer any valid reason why women practising midwifery in the towns should not be forced to undergo training within a limited period of time. This is actually the scheme proposed under the bill for the registration of nurses and midwives in the Punjab. Certain untrained midwives who are practising at present are either too old or are otherwise unable to undertake training. Such cases might be compensated, if there is real need, whilst being forbidden to practise. In actual fact in many instances the old fashioned *dai* is only partially dependent on midwifery for earning a living. It is a subsidiary occupation and enquiry has revealed that many women registered as *dais* conduct only a very small number of deliveries in any one year. Such women are not satisfactory midwives and would be better eliminated from practice. Recent enquiry has shown that in one town the number of midwives said to be practising was 125 while the number of births was 4,000 giving an average per midwife of 32 cases.

(ii) A necessary concomitant of such action would be the keeping of a register of all midwives practising in the area, with ability to take action against those not registered.

(iii) A better class of women should be trained. The present economic situation in India is forcing women of the middle classes to take up gainful occupations and in various places they are offering for training. Many of these women are literate and are educationally a great advance on the existing indigenous *dai*. If they were employed, the prejudice against maternity work would tend to disappear. Such women should be encouraged to undergo training and municipalities might well give them scholarships to go to hospitals or *dais* training schools for the purpose.

(iv) In many places municipalities are already employing their own midwives. This service is capable of much extension and development. It ensures, or ought to ensure, good service for the public and a decent livelihood for the midwife. Such midwives should be whole time salaried workers and fees should be recovered for their services from all who can afford to pay. Properly worked, a service of the kind should go a long way towards being self supporting. Well-to-do people require to be educated in the need for paying for adequate service at such important events. On the other hand the municipality must take steps to secure that the service is really good.

(v) One means of securing a good service is to have supervision of midwives. This can be effected by means of special posts as midwifery supervisors, or it can be done by means of health visitors. For good midwifery practice supervision is absolutely necessary. It might be thought that this requires no proof, but it is all too common to see midwives without any supervision whatever with disastrous consequences.

(vi) In places where maternity homes exist, these should also be supervised to ensure that proper standards are maintained. There is a real danger that small maternity homes will be run without adequate staffs and equipment and may end by disseminating sepsis rather than preventing it. Minimum standards should be enforced for such homes; these will safeguard the lives of the patients.

(vii) Antenatal work should be encouraged and in fact insisted upon at all welfare centres, hospitals or maternity homes maintained or assisted by municipalities. Antenatal work is not merely a means of discovery of abnormalities and anticipating complications of labour, it is also a means of educating women in the care required during pregnancy and in the necessity of a trained attendant during child-birth. If every pregnant woman in a town were given proper antenatal care, the maternal mortality figures would without doubt immediately decrease.

(viii) An investigation of maternal deaths would assist in planning for improved service and measures to reduce maternal mortality. A special worker could be appointed for a year. At the end of even one year a great deal of valuable information could be collected which would reveal the immediate and remote causes of deaths in child-birth and various other factors such as social circumstances, parity, age, etc., of the patient. The collection of reliable information is a necessary preliminary to the launching of any kind of propaganda. The latter is needed to secure appreciation of the new and better services offered.

These suggestions are perfectly feasible for many cities and towns and only courage is needed to put them into practice. It is realised, however, that any

municipal committee must carry its community with it in initiating such reforms. The futility of providing a service for people who do not know how to use it and are not ready for it has been amply demonstrated.

When examination of the position in rural areas is made, the difficulties are found to be much greater. The villages are still in the clutch of the indigenous *dai*; necessarily so, since she is the only person who is available for help. It is urgently necessary to plan something for rural India, however, for approximately nine times as many children are born in villages as in towns in India. At present nature sees to it that normal cases mostly recover, though the morbidity through bad midwifery and subsequent lack of nursing care can only be guessed at. In abnormal cases the patients die, sometimes undelivered, of sepsis or shock, or, if distances permit, they are taken into headquarters hospitals, usually too late. Now-a-days one hears a great deal of talk of rural uplift and women's needs have not been altogether neglected in these plans, but this problem of maternity work in rural areas has nowhere been attacked with the vigour it deserves. Schemes for giving village *dais* a few weeks experience in a hospital or lectures by medical men without any practical work will never meet the need.

A few schemes already in operation may be mentioned. In the *North-West Frontier Province*, a scheme has been sanctioned for the subsidising of midwives in selected villages. This has great possibilities and may prove an excellent method. In the *Punjab*, an attempt is being made to train and supervise village *dais* through the agency of health visitors. This scheme is a sound one in many ways, but it has the disadvantage of being slow and costly. In view of the difficulty of getting educated women to settle in villages, it may be wise to proceed with the training of village *dais*. More care needs to be taken in selecting suitable *dais* for training. In the *United Provinces*, a greater number of midwives trained on western lines are available than in most provinces in India, hence the training of *dais* has not been carried on systematically. The trained midwives have settled or have been posted in smaller towns, but the village problem has been left largely untouched. In *Bihar and Orissa*, a noteworthy step has been taken in insisting that all *dais* under training must spend three months in a hospital, thus ensuring a much better grasp of the principles of their work.

The *Central Provinces*, largely a rural area, has not evolved any specific method for dealing with village maternity needs, nor apparently has the Presidency of *Bengal*. In *Bengal* and *Assam*, however, a better class of woman is offering for midwives' training and it is hoped that some of these women will eventually settle in villages. In *Bombay*, the Lady Wilson Village Maternity Association maintained nine centres for training village *dais*. It is difficult to imagine, however, that such a short period of training without subsequent supervision can be very effective. *Madras*, like the U. P., has a larger supply than most provinces of western trained midwives and some of these are working in rural areas. Some of the districts have set themselves seriously to the organising of maternity and child welfare work and this is bound to have an effect on the maternity problem.

These efforts are, however, only touching the fringe of the problem, but there is everything to be gained by experiment. Since each province has its own special conditions, no one scheme is applicable to India as a whole and each should set itself to work out what is most suitable in its own area. The development of roads and means of transport will aid the village as much in the solution of this difficulty as in many others.

The actual training of midwives has been touched on in the preceding paragraphs, so that not a great deal remains to be said. The training of midwives in hospitals is on the whole satisfactory except in one respect and that is the absence of domiciliary experience. Pupils learn midwifery in hospitals where the conditions approach the ideal and when they are faced with conditions such as a confinement in a one-roomed hut they are unable to adapt themselves. This is a weakness which hospitals which otherwise give an excellent training should rectify. The opposite weakness is apt to occur in training schools which are not attached to hospitals. Such training schools are becoming more popular and they have much to commend them, but in some cases there is no opportunity for the pupils to see confinements under hospital conditions. Training schools exist at Dera Ismail Khan, Amritsar, Ludhiana, Ajmer, Lucknow and Sylhet. The project of such a school for Sind has unfortunately not materialised. The training of illiterate indigenous *dais* is still continuing in many places. If more "schools" could be established, this cumbrous and unsatisfactory method of training old fashioned midwives might in time be abandoned.

(c) Child Welfare Work.

45. It is now nearly twenty years since the first child welfare centres were started in India, and it may be useful to take stock of the present position. This work was introduced into India as a result of the example set in Europe without a great deal of reflection as to whether conditions in India were ripe for such a movement. In some ways they certainly were not. For example, the demand for cure or treatment was not satisfied as it apparently must be before preventive work has much chance of success. Furthermore, the raw material in the shape of nurses, or young women ready to be trained as such, needed to implement child welfare schemes, was not ready to hand. These were two major difficulties. Others were—a certain amount of ignorance and misunderstanding on the part of medical practitioners who had not watched the evolution of the movement in the West, the almost complete ignorance of the general public, hampering social customs such as early marriage and "purdah" and the profound illiteracy among the women of India. Perhaps it was as well that the early pioneers did not stop to think of the difficulties in their path or they might never have started at all. These obstacles to the development of the work still exist, but in spite of them, the number of centres has increased and there is a general appreciation of their usefulness even though the exact sphere of this usefulness is often imperfectly understood. Provinces such as the North West Frontier Province and Assam are at the beginning of their child welfare career for in such provinces medical and maternity needs are still far from adequate. In other provinces, the movement is thoroughly established and is coming to be regarded as an essential part of public health work. The part played by the provincial governments in the furtherance of child welfare work varies enormously as the following details of work in some of the major provinces will show.

In the *Punjab*, there were in 1933, 87 centres, including 34 sub-centres. All the main centres, except one, were in receipt of grants-in-aid from the provincial government. The total amount distributed in this way was Rs. 15,000. But in addition to this, the provincial government is responsible for the cost of the Health Visitors Training School and meets the salary of the Inspectress of Health Centres. The remaining cost of the upkeep of the centres is met from local funds or derived from the funds of the provincial branch of the Indian Red Cross Society. In *Delhi Province*, there are 22

centres, the cost of the urban centres (16) being mostly met from local funds. The total spent on maternity and child welfare in the province was almost Rs. 60,000 which represents 8% of the total expenditure on public health. This is a figure which is probably higher than in any other part of India though exact figures are not available. In the *United Provinces*, the local Government gave the large sum of Rs. 1,10,000 for maternity and child welfare work, but handed over the administration of this sum to the maternity and child welfare section of the provincial branch of the Red Cross Society. The Society itself contributed Rs. 20,000. It is very questionable whether such a large amount of public money should be given to a voluntary society, however efficient that society may be. It seems preferable that Government should control the expenditure of its own funds and moreover a voluntary society's proper function is rather to undertake pioneer and experimental work. No provision for training health visitors exists in this province and only 14 were employed in the whole province comprising fifty-one districts. It is difficult to see how proper health work can be carried on without trained workers.

The province of *Bihar and Orissa* is backward and poor and this is reflected in the fact that only seven trained health visitors are employed. *Bengal* would appear to be in the same state since very few health workers are employed in this Presidency. The provincial government contented itself by giving a grant of Rs. 15,000 to be spent (or misspent) on the training of *dais*. As mentioned elsewhere, this province has given no support to the training of health visitors. In the *Central Provinces*, the position is similar to that in the United Provinces in that the provincial government gives Rs. 30,000 to the provincial Red Cross Society for expenditure on maternity and child welfare work, the Society itself giving Rs. 16,000. The provincial government, however, meets the whole cost of the school for training health visitors. There are 48 centres in urban areas and 15 in rural areas.

Maternity and child welfare work in the *Bombay Presidency* receives very little help from the provincial government. There are no grants-in-aid to provincial societies or local schemes. Several associations are in existence which undertake some form of maternity and child welfare work, but there is great lack of co-ordination and co-operation. In individual places useful work is being done, but there is no plan or policy for the Presidency as a whole. It is obvious that some directing hand is required to advise, co-ordinate and control, so that waste of money and effort may be avoided.

The *Madras Presidency* enjoys the distinction of being the only province in India employing a medical woman as Assistant Director of Public Health for Maternity and Child Welfare. The importance of this appointment to the province as a whole will only be grasped when the results have had time to show themselves. District boards have already begun to take maternity and child welfare seriously. Their plans must be submitted to the Director of Public Health so that these will be scrutinised by one with knowledge and experience, a greater degree of uniformity will be ensured and money will be more wisely spent. Twelve district boards have sanctioned funds specifically for maternity and child welfare work. Sixty-five centres are in existence in rural areas and 75 in urban areas, but many of these centres are still only in charge of midwives and cannot therefore be doing good health work. The Health Visitors' Training School in Madras, under the auspices of the Red Cross Society, has, however, been reopened and so a supply of workers should soon be available.

In *Burma*, a trained health worker (not medical) is employed jointly by the Public Health Department and the Red Cross Society. The number of health visitors is increasing in the province and a great deal of valuable propaganda work has been done. There are now 17 maternity and child welfare centres, 15 urban and 2 rural. With the establishment of the Health School in Rangoon, the work should develop rapidly.

There can be no doubt that the appointment of medical women officers as assistants to the Directors of Public Health is what is required to develop maternity and child welfare work adequately in every province. Without this there can be no unifying influence, no declared policy, no control, no inspection and the positive features of encouragement, propaganda and advice are wanting. Only officers of this type can secure that the work is efficiently carried on and properly trained workers employed. Local bodies are apt to be careless in scrutinising the qualifications of those whom they appoint as health workers and the work suffers. What is happening in the various provinces illustrates the need aptly. Child welfare work is best where there is provincial control and poorest where there is none. The fact that some provinces are providing funds and personnel and even training schools shows that they think this is a desirable form of public health expenditure. Others are apparently of a different opinion, but there can be no doubt of the correct course.

The above statement of the present position shows an advance in the course of twenty years, but the amount of work being done cannot be said to have influenced the infant mortality rate of the country appreciably. Even in a city like Delhi with its 16 health visitors the infant mortality rate was 233 per 1,000 live-births, while in Madras with 31 the figure was 264. No doubt many of these deaths and hundreds of thousands of similar ones are due to causes which are outside the range of maternity and child welfare work; still one cannot avoid the conclusion that the work might be much more effective and must be made so before infant mortality rates show any considerable reduction.

What factors are likely to improve the effectiveness of the work? More control from above as already indicated, employment of a better trained personnel and a better understanding on the part of employing bodies as to the aims of child welfare work are the most important. Further expenditure is doubtless necessary in many cases but wisdom in spending available resources is just as necessary. One further point must be mentioned and that is the need for greater co-operation between welfare centres and hospitals. These are too often still seen working as separate entities each losing in effectiveness because it does not take advantage of the help the other could provide. The following sentence written by a medical woman who has seen the value of co-operation is worth quoting :—

"The importance of the health of mothers and babies does not need to be stressed, but it is only by continuous effort and teaching that such diseases as rickets, anæmia of pregnancy, osteomalacia, infantile diarrhœa, tuberculosis and malaria will be diminished, and no one is better fitted to give this teaching than a trained health visitor seeing women in their own homes, especially when she is working in connection with a hospital, thus enabling prevention and cure to go hand in hand."

(d) Health Visitors and Health Training.

46. A rough computation of the number of health visitors working in India would give a figure of about 300—that is less than one per million of the population. In some centres, the ineffective system of employing nurses and midwives as health visitors is still in vogue. The provinces which employ the greatest number of health visitors are the Punjab, the Central Provinces and Delhi. The two former provinces have for some years had health schools which are financed by the provincial governments concerned. The presence of a training school and the number of welfare centres and health visitors employed are circumstances which are always closely connected. If a province is intent on work of this kind, it finds it necessary to provide a school for training workers. It is therefore no accident that the two provinces which have their own training schools should have the greatest number of health visitors. Nor is it accidental that the Presidencies of Bengal and Bombay, which have never supported the schools which voluntary societies have established, should be poorly supplied with health visitors. The Madras Presidency has a school which is supported mainly by the Indian Red Cross Society, but it is now receiving a Government grant. Burma is hoping to start a school of its own in the near future. The Lady Reading Health School at Delhi continues to be an all-India Institute and it is hoped that in the course of time it may undertake the training of a superior grade of workers as indicated in the report of the previous year.

The standard of previous education of candidates for training as health visitors rises very slowly and the courses of study offered are really too short to allow of the training being adequate. Motives of economy seem to outweigh desire for efficiency, but is it economical in the long run to turn out workers who are not properly qualified ? Even in places where there are health centres under trained workers, a great deal of valuable material is now being lost because the workers are not sufficiently educated to make proper records or work up the material when recorded.

In such a huge country as India, embracing so many different provinces, it is difficult to set up a single standard for training health visitors. In the absence of a Ministry of Health there is, in any case, no authority which could establish such a standard or inspect the teaching institutions concerned. This is a defect which should be remedied in time for it is to be feared that the teaching equipment is not as good, and examination standards are not always as high, as they might be. Medical colleges and schools are inspected and now nursing training schools in several provinces are inspected and approved before they can undertake training of nurses. Health visitors' training schools will have to submit to similar inspection and will benefit by it. Health schools should also be encouraged to give revision or post-graduate courses and employing bodies should encourage their workers to attend such courses.

This is perhaps a suitable place in which to refer to the course which opened in the autumn of 1933, for training medical women for a special diploma in maternity and child welfare. For several years past, medical women have been employed in some of the larger municipalities to organise and supervise maternity and child welfare work. It was found that in the majority of cases such doctors had had no training in, or experience of, the work they were asked to perform. As a result the tendency for welfare centres to become dispensaries was intensified and the schemes were neither preventive nor educational

in their outlook. In India, the D. P. H. course did not meet the need and there was no other opportunity to undergo training of the kind required. The fact that one of the sections of the new All-India Institute of Hygiene, Calcutta, was devoted to maternity and child welfare made it possible and suitable to attach such training to the Institute, while at the same time it offered the candidates other facilities for the study of hygiene, vital statistics, etc. A course has been drawn up which embraces all aspects of maternal, infant and child care and the organisation of schemes to implement such care. It is to be hoped that the opportunity offered by the course will be taken advantage of by medical women who take up this most important branch of preventive medicine. Within a few years, trained workers should be available for every municipality or local body desirous of employing such women. Their number must increase with the spread of the work itself.

Table B on page 346 gives the numbers of "M. and C. W." centres, trained health visitors, midwives and *dais* employed in rural and urban areas in the different provinces. This Table should be studied for further details.

SECTION IV.

PUBLIC HEALTH ADMINISTRATION.

Administration.

N.-W. F. P.

47. The I. G. C. H. is *ex-officio* D. P. H. and has two A. D. P. Hs. working under him. One of the A. D. P. Hs. is in charge of the public health laboratory in Peshawar.

Punjab.

As a result of retrenchments, the A. D. P. H. (technical) for vaccination, was placed in additional charge of the Rawalpindi circle ; the A. D. P. H. Lahore circle acted also as personal assistant to the D. P. H. ; one A. D. P. H. was in charge of the Ambala circle alone whilst the Jullundur and Multan divisions remained without Assistant Directors. An epidemiologist was also employed. The sanctioned strength, 28 of the provincial cadre of district M. O. Hs. remained unchanged, but owing to shortage of staff, the M. O. Hs. of Rawalpindi and Gurdaspur districts held additional charges during the summer as health officers of Murree and Dalhousie. The subordinate provincial staff employed under district M. O. Hs. consisted of 28 sanitary inspectors, *i.e.*, 1 in each district plus an epidemic staff of 10 sub-assistant health officers and 15 sanitary inspectors. Additional emergency staff was engaged when necessary, *e.g.*, at the Sun eclipse fair at Thanesar and in connection with the famine test works in Hissar district. Only 13 municipalities employed M. O. Hs. but in Gujranwala and Gujrat, the district M. O. Hs. acted also as municipal M. O. Hs. 26 other municipalities employed junior officers as part-time M. O. Hs. ; 5 municipalities engaged private practitioners for part-time services ; and in 6 towns the civil surgeons acted as *ex-officio* M. O. Hs.

Delhi.

The P. H. C. with the Government of India is *ex-officio* D. P. H. of this small province, but the public health administration is actually carried out by an A. D. P. H. who also acts as M. O. H. of New Delhi and the Notified Area. The Delhi Municipality employed an M. O. H.,—a part of whose salary is provided by the local Administration. In some rural towns, the dispensary

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Abbreviations :—

D. P. H.	Director of Public Health.
A. D. P. H.	Assistant Director of Public Health.
M. O. H.	Medical Officer of Health.
M. O. S.	Medical Officer of Schools.
I. G. C. H.	Inspector General of Civil Hospitals.
L. C. P. S.	Licentiate of the College of Physicians and Surgeons.
U. P.	United Provinces of Agra and Oudh.
C. P.	Central Provinces and Berar.
B. & O.	Bihar and Orissa.

sub-assistant surgeon acts as part-time health officer, a good plan if the medical officer has some training in public health. In rural areas, the district board is generally responsible for the enforcement of suitable health measures. Bye-laws, applicable to rural districts, are contained in notification No. 7713-Education, dated the 1st November, 1927, issued under sections 56 and 57 of the Punjab District Boards Act, 1883 ; these relate to the disposal of refuse, manure and nightsoil, control of wells for drinking purposes ; collection and steeping of hemp ; excavation of pits, etc. ; disposal of dead bodies and carrying on of skinning and tanning processes.

United Provinces of Agra and Oudh.

The drastic retrenchments carried out in 1932 remained in force during 1933. During the year the specialist post of Superintendent, Vaccine Depôt, was replaced by a post in the provincial public health service. Government approved of the scheme for transfer of municipal and district M. O. Hs. after every 4 years.

The new rates of pay sanctioned in 1933 by government for officers of the provincial and subordinate Public Health Service were (*a*) Provincial Rs. 200—15—380—20—500—25—650 and (*b*) subordinate (i) Upper grade Rs. 150—5—200—10—300 and (ii) Lower grade Rs. 100—5/2—150 (including all allowances).

The total allotment for the Public Health Department including the Engineering Branch and the Board of Public Health was Rs. 19,46,392 as against Rs. 19,18,000 in 1932-33. Out of this sum, the budget of the D. P. H. amounted to Rs. 12,87,579 as compared with Rs. 12,77,915 in 1932-33.

Two A. D. P. Hs. were on general inspection duty, each in charge of a range ; 2 on technical duties—one holding the combined charge of the epidemiology and malariology bureaux and quinine factory and the other directing the publicity bureau and the school health service. The administration of the provincial Hygiene Institute was in charge of the senior lecturer.

The district health scheme, in force in 28 districts, was not extended to any of the other 20 districts. Of the former, 22 had also an assistant health officer each, Gorakhpur district had 3 and Basti and Azamgarh 2 each. The district M. O. Hs. in addition to supervising the health of the smaller municipalities visited 43,503 villages, including 6,623 infected with epidemic disease. They trained 52,425 school boys in village aid work in addition to 15,428 government servants, school teachers, *choukidars*, *patwaris* and subordinates of the Co-operative Department and 10,920 other persons. They also opened 654 first-aid dispensaries, including 126 in the district of Gorakhpur, 101 in Kheri, 84 in Unao, 65 in Muzaffarnagar, 51 in Partabgarh and 40 in Gonda. Other activities included 556 magic lantern demonstrations and 38,946 lectures ; the training of 10,178 *dais* ; and the examination of 101,436 children in 1,649 schools. Village aid dispensaries totalled 2,314 ; the whole scheme was in force in 1,562 villages and part in 3,672. The first aid dispensaries in existence in the province totalled 2,975.

The rural reconstruction or village uplift committees mentioned in previous reports continue to carry out satisfactory work.

Owing to financial stringency, it was not possible to appoint M. O. Hs. in the 12 third class towns which have been on the list for some years. The sanctioned scale for employment of sanitary inspectors is 1 for each group of 20,000 of the population.

The provincial Hygiene Institute continued its useful work. 34 underwent training for the M. B., B. S. degree in hygiene, 1 for D. P. H. (part II), 7 for L. P. H. (parts I and II), 43 as sanitary inspectors, whilst 19 passed the first-aid examination of sanitary inspectors. A post-graduate course, including a course in malariology, hygiene publicity and maternity and child welfare, was provided for 1st class M. O. Hs. from October to December and for those of the 2nd class from July to September, 1933.

The routine and special work at the Institute included (*a*) bacteriological and chemical examination of water supplies; (*b*) investigations in connection with the collection and transmission of samples of blood from suspected cases of tick typhus in the Nainital district and of typhoid carriers in the district jail, Gorakhpur; (*c*) examination of stools of suspected cholera cases at the commencement of epidemics and (*d*) a special hookworm investigation financed by the Rockefeller Foundation to determine the correlation between the average egg count and average worm count in controlled populations in Lucknow and in the district jails.

Health Unit, Partabgarh.—The unit was under the administrative charge of the Hygiene Publicity Bureau. The following note by the D. P. H. gives an account of the work done by this unit :—

"The Health Unit Scheme was inaugurated in the district of Partabgarh two and a half years ago with the aid of funds given by the Rockefeller Foundation. The total expenditure on the Health Unit comes to Rs. 30,000 annually. In the first year the Foundation met one half of the cost of the scheme, the other half was met by the Public Health Department in the form of pay of staff deputed to the Unit and the Provincial Red Cross fund. In the second year the grant from the Rockefeller Foundation was decreased to 1/3rd, 2/3rds being met from Red Cross and Public Health Department. In the 3rd year the grant has been reduced to roughly 1/4th of the total and the balance is being met by Public Health Department and Red Cross.

The scheme was initiated at the instance of the Rockefeller Foundation with a view to give the same protection from preventable diseases to the villagers as are enjoyed by the residents of urban areas and to create a sanitary conscience amongst the masses and to afford facilities in regard to maternity and child welfare work in all the villages under the jurisdiction of the Health Unit scheme.

The scheme is at present operative in one municipality, two Town areas and 53 villages having 40,000 population covering roughly an area of 40 square miles. The following staff is working in the area —

1 Medical officer—An officer of the Provincial Public Health Service with qualification of M.B., B.S., D.P.H., who has received special training in this method of work in the U. S. A.

4 Sanitary inspectors.

1 Labour gang of 6 coolies.

1 Lady doctor.

3 Health visitors.

8 Midwives.

11 Indigenous *dais* and clerical establishment.

The office is accommodated in the Town Hall at Bela which has been kindly placed at the disposal of the Health Unit by the Municipal Board, Bela. The whole area is divided into 4 circles and each circle is manned by one sanitary inspector, two midwives and one health visitor.

The sanitary inspector looks after the general sanitation, vaccination, registration of vital statistics and sanitary improvements of permanent nature and trains teachers and scholars in anti-epidemic work and gives demonstrations by magic lantern on health subjects and epidemic diseases. They are in direct charge of the surface cleanliness of the area in which they work and get manure heaps removed to fields and have the villages swept by labour gang as well as by the villagers from time to time. They carry out

anti-epidemic measures under the direction of the medical officer and during the non epidemic season the staff is engaged in getting manure pits dug, trench pattern and borne-hole latrines made, wells improved and made sanitary to prevent outside contamination. Attempts are being made also to provide soakage pits for the disposal of waste water and sullage of lanes and private houses. Demonstration cattle sheds have also been made in a few villages. Lighting and ventilation have been improved in quite a large number of houses by providing windows and ventilators.

Maternity.—Midwives attend normal labour cases and conduct deliveries at the villagers' homes. All abnormal cases are advised to go to the Dufferin Hospital. Ante-natal and post-natal clinics are held by the health visitors twice a week and expectant mothers are given instructions on rearing of infants, health subjects, domestic hygiene, personal cleanliness and the precautions to be taken during the course of pregnancy and confinements. They have succeeded in popularising the maternity work to the extent that 75% of confinements are conducted by qualified midwives. The woman doctor supervises the work of health visitors and midwives and holds clinics and inspects scholars in the lower primary schools. The clinics are held at the houses of midwives. Majority of the indigenous *dais* have been trained by the midwives and health visitors and almost, 30% of them have been supplied with maternity boxes. Twenty-six first-aid dispensaries have been opened in the whole area to give medical relief. These are housed in schools and in the houses of village guides.

Junior Red Cross groups have been formed in 20 schools and the boys have been trained in anti-epidemic work.

Vaccination.—Barring those who are unfit for vaccination every child born during the year is vaccinated by sanitary inspectors, midwives and health visitors.

The health unit area also serves as a field training centre for the public health personnel of the Province."

Bihar and Orissa.

Three A. D. P. Hs. were at work, each in charge of a circle. In addition to their usual duties, their supervision and expert advice have greatly assisted local bodies in improving drainage and water supplies and in the proper disposal of refuse, excreta, etc. A permanent staff of reserve M. O. Hs. of the assistant surgeon grade is also maintained and is detailed on demand to any district to combat the spread of major epidemic diseases. In addition to 100 vaccinators who are trained in disinfection work, a temporary staff of epidemic doctors of the sub-assistant surgeon class is maintained to assist local bodies in controlling epidemics in the districts.

Of the 12 district boards employing health officers, Cuttack, Puri and Balasore received government grants covering half the total cost; Saran, Champaran, Gaya, Muzaffarpur, Shahabad and Bhagalpur employed M. O. Hs. wholly paid by Government; whilst Darbhanga and Purnea met the whole cost. In Patna the health officer was seconded from the provincial public health service. With the introduction of the health organisation scheme, the health officers of these districts also act as Superintendents of Vaccination. The district boards of Monghyr, Manbhum, Ranchi and Hazaribagh, which do not employ health officers declined even to accept the services of M. O. Hs. paid by Government although they were required to pay only the latter's travelling allowance and to employ adequate subordinate health staffs. Other districts maintained only small health staffs and either recruited additional staff during emergencies or obtained the loan of the services of epidemic doctors from the permanent government cadre. The expenditure on sanitation incurred by these boards amounted to Rs. 5,13,903 only or only about 3% of their aggregate income.

Of the 58 municipalities, only Gaya, Patna, Puri, Bhagalpur and Darbhanga had whole-time health officers. In the first three, the health officers were paid by government and in the other two from municipal funds. The municipalities of Cuttack and Ranchi agreed to employ whole-time health

officers, but large towns such as Muzaffarpur, Chapra, Monghyr and Arrah were still without such officers and depended on the services of government epidemic doctors when occasion arose. The question of appointing licentiates with suitable public health qualifications as health officers in the smaller municipalities was under consideration.

Municipal expenditure on sanitation totalled Rs. 17,58,410 or about 35% of the total income.

The public health laboratory continued to carry out chemical and bacteriological work.

Central Provinces and Berar.

Expenditure on public health administration amounted to Rs. 3,36,000. The I. G. C. H. continued to act as the D. P. H. in addition to his own duties but during 1934 the post of D. P. H. was revived.

Qualified health officers were employed only in the municipalities of Nagpur, Jubbulpore and Amraoti; in some others trained sanitary inspectors were in charge of sanitation. In all, only 68 sanitary and health inspectors were employed in urban areas, 22 of these being in Nagpur district. Towns in the districts of Betul and Balaghat had no sanitary inspector; Drug and Mandla had 1 each; Chanda, Chhindwara, Hoshangabad, Bilaspur, Bhandara, and Buldana 2 each; in others the numbers varied between 3 and 5. Other health staffs included 1 leprosy specialist, 2 health publicity officers and 1 woman superintendent of the health school.

The scheme for the appointment of district health officers remained in abeyance. It is to be noted with regret that, in the rural districts in this province, not a single sanitary or health inspector is employed.

The village sanitation Act, the *Mukkaddam* rules, the *ryotwari* system and the village *panchayat* Act continued in operation. Rural uplift work in the form of sanitary surveys, drainage improvements, rubbish and manure disposal, disinfection of water supplies, etc., was continued in the Piparia circle of Hoshangabad district. Similar work was begun also in selected areas in the districts of Saugor and Nimar.

The Public Health Institute, Nagpur, continued to function as the provincial bacteriological and chemical laboratory.

Bombay Presidency.

The total budget allotments under the control of the D. P. H. aggregated Rs. 8,36,116 in 1933-34. The provincial health staff included 1 D. P. H.; 4 A. D. P. Hs.; 1 Director of the Vaccine Institute; 2 officers in charge of the public health laboratories at Poona and Karachi; 17 M. O. Hs. and 96 sanitary inspectors in municipalities; 3 district M. O. Hs. subsidised by government; and 31 inspectors of sanitation and vaccination, 1 to 2 working in each district.

Of the 154 municipalities only six employed qualified M. O. Hs. In Karachi, a qualified assistant health officer and in Ahmedabad a deputy health officer were also employed. Otherwise, no advance has been made in the numbers of health officers quoted in the last report. 97 qualified sanitary inspectors were employed in 48 towns. Of the 152 students who appeared for the sanitary inspectors' examination, 62 were awarded certificates from the Royal Sanitary Institute, London. Of the 6 medical men who appeared, one qualified for the post of junior M. O. H.

A sanitary board at Siddapur in Kanara district and 548 sanitary committees and village *panchayats* were also at work.

The Poona and Karachi public health laboratories continued to carry out useful work.

Madras Presidency.

The cadre of the Public Health Department in addition to the D. P. H. includes 5 A. D. P. Hs. including 1 post of the Professor of Hygiene, 55 health officers of the first class, 48 of the second class, 285 health inspectors, 42 government vaccinators, 832 vaccinators employed by local bodies, 30 probationer vaccinators and 2 compounders. Of the M. O. Hs. 66 were employed in urban areas ; 12 of these hold a D. P. H., 26 a B. S. Sc. corresponding with D. P. H., Calcutta, and 28 hold government diplomas in public health corresponding with Licentiates. In the urban areas of Chittoor and North Arcot, apparently sanitary inspectors were in charge of sanitation as no health officers were employed.

Every rural district had its health organisation and M. O. H. and some of the districts employed as many as 3 or 4 health officers. One of the cadre health officers continued to be employed as malaria officer and another in connection with the rural development scheme in Tiruvallur. Continued attention was directed towards the evolution of a cheap type of village latrine and the prevention of soil pollution. The field staff consisted of 6 rural sanitation units, which at the close of 1933 were at work in the districts of East Godavari, Madura, Coimbatore, Salem and Vizagapatam and in the rural development area of Tiruvallur. These units continued to be engaged on (*a*) an intensive educational campaign against hookworm and soil pollution ; (*b*) mass treatment of hookworm infection in school children ; and (*c*) the provision of village latrines. I agree with the D. P. H.'s remarks when he says :—

"The time has probably now come for the rural sanitation campaign to pass beyond this important preliminary stage, to reorganise itself so as to take cognizance of other aspects of the work for the improvement of environment in rural areas, such as, water supplies, drainage and conservancy."

Assam.

The budget allotment for the year 1933-34 for the Public Health Department amounted to Rs. 6,10,600, whilst that for the heads administered by the D. P. H. aggregated Rs. 5,16,194.

In addition to the D. P. H. and 2 A. D. P. Hs. other health personnel included 11 urban health officers, of which only one at Shillong was fully qualified, 7 assistant surgeons, 104 sub-assistant surgeons and 39 inspectors of vaccination.

Burma.

The local authorities spent Rs. 66,03,396 or 18% of their available income on public health services. This sum included Rs. 58,10,429 or 2% in towns and Rs. 7,92,967 or 8% in districts.

The headquarters staff consisted of a D. P. H. and 2 A. D. P. Hs. One of the A. D. P. Hs. was sent on tour during the year to study port health organisations in the Far Eastern ports and his report has been published.

As in 1932, whole-time district health officers were employed only in the 3 districts of Akyab, Myaungmya and Pyapon and 5 assistant district health officers were sanctioned in the districts of Prome, Bassein, Thaton and Mandalay. In the 32 remaining districts, the civil surgeons were expected to act

as part-time health officers. Other subordinate health personnel in rural areas consisted of public health inspectors of vaccination, vaccinators and conservancy *coolies*.

Out of 58 municipalities only 12 employed whole-time health officers. Of the 22 sub-assistant surgeons sanctioned for the Public Health Department only 17 were actually employed for epidemic and general sanitary duties. The total number of health inspectors employed during the year was 172 of whom 120 worked in towns and 52 in rural areas.

For towns with a population of over 20,000, medical graduates possessing a D. P. H. are required to be employed ; second class towns with a population between 10,000 and 20,000 are required to employ licensed medical practitioners who have passed the examination for the License in Hygiene. Owing to the difficulty experienced in getting private practitioners to undergo this course, the provincial government agreed to provide them with free training. The proposal to appoint sub-assistant surgeons in local hospitals or dispensaries as part-time health officers was dropped.

The Hlegu Health Unit.—The experience gained during the 4 years of its progressive work has enabled the unit to ascertain with considerable accuracy the elements necessary for carrying out effective public health service in rural areas. The presence of this unit in Hlegu township has resulted in an obvious improvement in the habits, knowledge and practices of the inhabitants in health matters and in their attitude towards measures designed for their improvement. The 3 major epidemic diseases were entirely absent, although since the inception of the health unit at least one of the 3 diseases has been present annually and in the year 1928 all three prevailed. Over 52% of the population is protected against small-pox and the unit was endeavouring to eliminate this disease completely. Intensive health education and propaganda were carried out and 391 lectures, cinema shows and school and lantern talks were delivered to audiences totalling over 29,000. Leprosy clinics were held twice a week in Hlegu and once a week in Dabein ; 47 villages were surveyed and of the 4,230 persons examined, 80 or nearly 21 *p.m.* were found to suffer from leprosy. 165 laboratory examinations, 1,731 visits to clinics, 3,395 home visits by the nurses, 2,475 ante-natal visits by the midwives, 777 labour cases and 3,184 post-partum visits were registered. 102 expectant mothers visited the ante-natal clinics.

A health survey of 136 houses in 6 villages were made and other inspections totalled 15,953, including wells, tanks, latrines, eating shops, meat, fish and vegetable stalls, cowsheds, slaughter-houses and house premises. Special attention was paid to the protection of food and water supplies and to the proper disposal of refuse and excreta. Over 80% of the dwellings in Hlegu have now been provided with bore hole latrines and the few pail latrines that still exist have been made flyproof and sanitary.

The students of the public health inspectors' class were given 2 weeks' practical training and 9 sub-assistant surgeons were also trained.

The Harcourt Butler Institute of Public Health.—The plague section, in addition to the examination of rats for plague infection, carried out an investigation into the jumping powers of the common Burmese rat, *Mus concolor*. The highest jump recorded for this species of rat was 20 inches. The malaria bureau investigated the incidence of malaria in selected areas in the districts of Insein, Kyaukse, Shwebo and Hanthawaddy and in the Southern Shan States. In accordance with the recommendation made in 1931 by a committee which met to consider the future disposal of sewage in Rangoon, the chemical section,

with funds provided by the Rangoon Corporation, investigated the extent of pollution of the Rangoon river. Classes for the Rangoon University M. B. course in hygiene and the Government of Burma qualifying course for public health inspectors were also held.

In Appendix IV on page 348 will be found details of health staffs employed in different provinces.

Medical Inspection of Schools and Colleges.

N.-W. F. P.

48. Medical inspection of school children was continued in the municipalities of Peshawar, Bannu, D. I. Khan, Abbottabad and Kohat. Of a total of 32,716 children examined between July, 1932, and June, 1933, 7,216 or 22% were found unclean ; 362 or 1% had skin diseases ; 6,300 or 19% dental diseases ; 7% ear, nose and throat affections ; and 9% enlarged tonsils and adenoids.

Out of a total of 1,746 external eye disease cases dealt with in Peshawar 1,581 were trachoma cases ; in D. I. Khan the figures were 8,646 and 1,453, respectively. 6 % of the children examined were found to suffer from defective vision ; and in Peshawar, Bannu and D. I. Khan this percentage was 5·5%—the chief causes being errors of refraction, 5% in Peshawar, 5·4% in Bannu and 3·0% in D. I. Khan. Other defects included malaria 1,095 cases or 3%, enlarged spleen 2,099 or 6%, anæmia 1,650 or 5%, tuberculosis of the lungs 20 cases, other tubercular disease 22 and mumps 10. 31 children were found unvaccinated. Owing to a threatened outbreak of smallpox in Peshawar, Bannu and D. I. Khan, nearly all the students were re-vaccinated ; in Abbottabad they were inoculated against cholera ; whilst 532 children in D. I. Khan were given T. A. B. inoculations.

Punjab.

The experimental scheme for the medical inspection of school children, which had been in force since 1926 in the rural districts of Gurgaon, Jullundur, Sialkot, Sargodha and Multan, was modified in two ways. In the first place, the work was given over to the Medical Department and secondly the scope of this work was limited to rural schools within a radius of 2 instead of 3 miles. These modifications were found necessary because experience had shown (1) a lack of interest on the part of medical officers owing to inadequate remuneration ; (2) failure on the part of parents to obtain the treatment suggested ; and (3) administrative difficulties in the dual control exercised by the medical and the public health departments.

The revised scheme is reported to have worked satisfactorily in 3 of the 5 districts. In urban areas, the Education Department have successfully tried self-supporting schemes, the one in Jullundur city and the other in the districts of Amritsar and Sialkot. The former is suitable for larger areas with groups of schools and, under it, the schools combine and form a students' health committee, engage a whole-time doctor, open a dispensary and conduct the medical inspection and treatment of the scholars of the schools concerned. The Sialkot and Amritsar schemes are suitable for smaller areas with single schools which arrange with a local practitioner for part-time services.

A. D. P. Hs. inspected 17 schools and 1 college and district M. O. Hs. 1,162 schools. A pamphlet in English on " trachoma " was distributed in schools.

Delhi.

The medical inspection staff for urban areas and the arrangements for inspection were the same as previously reported.

Details of the various defects found in the pupils attending the high, middle and primary schools are given in Table IV (*i*).

TABLE IV (*i*).

	Boys.	Percent. of exmd.	Girls.	Percent. of exmd.
Total	**22,325**	**80·9**	**2,229**	**35·0**
Defective vision	2,769	10·0	37	0·6
Trachoma	3,490	12·6	159	2·5
Diseases of skin	1,336	4·8	16	0·3
Diseases of teeth	2,071	7·5	217	3·4
Diseases of throat	1,846	6·7	28	0·4
Enlarged tonsils	2,333	8·5	897	14·1
Diseases of nose	27	0·1	10	0·2
Diseases of ear	154	0·6	18	0·3
Diseases of glands	1,384	5·0	12	0·2
Diseases of lungs	1	—	—	—
Other diseases	411	1·5	141	2·2
Malaria	1,813	6·6	130	2·0
Unvaccinated	7	—	90	1·4
Not re-vaccinated	1,582	5·7	259	4·1
Debility	157	0·6	116	1·8
Uncleanliness	2,944	10·7	99	1·6

In urban areas, of 20,869 boys in 101 schools, 17,739 were examined; 1,610 had defective vision in both eyes and 662 in one eye. Of 6,073 girls examined 1,766 were recommended for treatment.

Table IV (*ii*) gives interesting figures :—

TABLE IV (*ii*).

	Boys.				Girls.			
	Urban.		Rural.		Urban.		Rural.	
	Defectives.	Percent. of exmd.	Defectives.	Percent. of exmd.	Defectives.	Percent. of exmd.	Defectives.	Percent. of exmd.
Total	**14,605**	**82·3**	**7,720**	**78·2**	**2,083**	**34·6**	**146**	**48·3**
Defective vision	2,272	12·8	497	5·0	27	0·4	10	3·3
Trachoma	2,345	13·2	1,145	11·6	141	2·3	18	6·0
Skin diseases	876	5·0	460	4·7	13	0·2	3	1·0
Diseases of teeth	1,243	7·0	828	8·4	206	3·4	11	3·6
Diseases of throat	1,430	8·1	416	4·2	2	..	26	8·6
Enlarged tonsils	1,770	10·0	563	5·7	888	14·6	9	3·0
Diseases of nose	12	0·1	15	0·1	8	0·1	2	0·7
Diseases of ear	33	0·2	121	1·2	11	0·2	7	2·3
Diseases of glands	1,374	7·7	10	0·1	12	0·2	..	..
Diseases of lungs	1	..	..	..	..	..	..	..
Other diseases	317	1·8	94	1·0	139	2·3	2	0·7
Malaria	771	4·3	1,042	10·6	122	2·0	8	2·6
Not re-vaccinated	..	..	1,582	16·0	243	4·3	16	5·3
Unvaccinated	..	..	7	0·1	90	1·5	..	..
Debility	157	0·9	..	..	116	1·9	..	..
Uncleanliness	2,004	11·3	940	9·5	65	1·1	34	11·2

It is worthy of note that 23% of all the boys examined were found to have eye disease. Whilst the incidence of trachoma seemed to show little difference in rural as compared with urban areas, defective vision and enlarged tonsils were very much more common among urban than among rural boys. The only other variation worthy of comment is that under "diseases of glands"; the very high incidence among urban boys is a striking commentary on health conditions in Delhi city.

In Delhi city many boys and girls sought treatment at the civil hospital at outdoor dispensaries or from private practitioners. In urban areas, of 7,864 boys and 1,590 girls with defects 4,402 and 291, respectively, received treatment. In rural areas 945 boys and 34 girls were treated by teachers for uncleanliness and minor ailments; 1,560 boys and 17 girls attended at dispensaries. First-aid boxes were maintained for emergent cases in 8 district board middle schools.

United Provinces of Agra and Oudh.

During 1933, greater attention was given to school anti-epidemic work in towns visited by epidemics. In Agra, quinine mixture was supplied free during the malaria season; 964 anti-plague inoculations and 4,500 re-vaccinations were performed and a preventive campaign in the form of throat gargles and nasal douches was organised on the outbreak of C. S. fever. 1,305 vaccinations and 623 anti-plague inoculations were performed in Bareilly; 1,664 vaccinations in Benares; 5,000 in Shahjahanpur; and 461 in Gorakhpur; 927 anti-plague inoculations in Gorakhpur, 358 in Meerut, 2,352 in Moradabad and 1,112 in Saharanpur.

Table IV (*iii*), giving the average weights in lbs. and heights in inches for various ages, is taken from the D. P. H.'s report.

TABLE IV (*iii*).

Anthropometric standards.		Age in years.	As ascertained in the U. P.	
Weight.	Height.		Weight.	Height.
44	44	6	43	37
50	46	7	46	45
55	47	8	48	49
60	49	9	53	59
67	52	10	54	60
70	53	11	55	63
75	55	12	57	68
82	58	13	57	74
92	59	14	59	84
102	62	15	60	89
119	64	16	62	98
..	..	17	64	100
..	..	18	64	104

A study of the diets in an intermediate college at Lucknow showed that 52% of the boys took less protein than was physiologically necessary whilst in most cases the protein was of poor biological value; 65% had an insufficiency of carbohydrates; 70% had an excess and 5% a deficiency of fat;

13% had no fruit and 21% had no milk. In Cawnpore, over 7% of the boys were ill-nourished. The supply of sprouting gram to school boys has been extended all over the province. From a controlled experiment in Shahjahanpur, it was found that over a period of 6 months the boys consuming this gram showed on an average an increase of 0·6 lbs. as compared with those who did not use it.

In a school in Benares, 13% of the boys were found harbouring filarial parasites, although clinical signs were not apparent. In the schools of Gorakhpur district the incidence of goitre was 11%.

In most centres arrangements for treatment were improved. At Benares, Bareilly, Jhansi and Meerut, the school health officers started clinics in the local dispensaries. First-aid equipment at a small cost was provided in the municipal schools in Fyzabad and Pilibhit. In 9 of the 12 English schools in Cawnpore first-aid equipment was maintained in charge of teachers. All the 14 schools in the Partabgarh health unit had village aid dispensaries and clinics were held in three of these. The scheme for provision of central school dispensaries was commenced in 5 larger cities. Arrangements were made for dental treatment at Agra, Bareilly and Shahjahanpur.

Lectures on hygiene and first-aid were given in the training college in normal and *patwari* schools and to the physical training classes of the Education Department. Training in first-aid was given at Lucknow by the staff of the Hygiene Publicity Bureau to those school teachers who were associated with the girl guides movement. School health officers examined 5,190 boys and 61 girls in the Mackenzie school course and organised dramas and exhibitions on subjects of health and hygiene in a number of centres.

The number of Junior Red Cross groups rose from 1,049 to 1,640 with a total membership of over 46,000.

School health officers were supplied with sets of diagnostic instruments, those of Agra, Lucknow, Gorakhpur and Saharanpur were trained in the eye, ear, nose and throat departments of the medical college, Lucknow and medical school, Agra.

The educational Code was amended in several directions. No unvaccinated boy can now be admitted to a recognised English school except on the express condition that he shall be vaccinated during the next vaccination season. The provisions of the Code now empower the school health officer as well as the head of a recognised institution to disallow attendance of suspected cases of communicable diseases until examined and certified as free. The relevant provisions of the Code. enjoining aided English institutions to co-operate with school health officers, were extended to unaided institutions of the same class.

The 13 whole-time school health officers carried out detailed inspections of over 50,000 scholars, or 61% on the rolls of 151 schools and ordinary inspection of 30% of those in 481 other institutions. The *ex-officio* school health officers in 15 of the 21 smaller municipalities conducted detailed examinations of 6,276 boys out of a total of 16,000 on the rolls of 48 institutions; they also carried out ordinary inspections of 5,297 boys out of a total of 16,000 in 125 schools. In 13 out of the 29 rural districts detailed examinations of 3,844 boys were carried out in 35 English schools and ordinary examinations of 44,312 boys in 764 schools.

Bihar and Orissa.

A special staff of 5 school medical officers and 5 assistants under the administrative control of the A. D. P. Hs. is maintained for the 5 divisions in the province for medical examination of scholars of the high English schools and the middle English schools at those places only where there is also a high English school. These officers not only inspected the scholars but gave lectures on hygiene and reported on school buildings. A woman school medical officer also inspects girls schools. As an experimental measure in some districts the M. O. Hs. were required to examine the health of scholars in primary and middle English schools at places where there are no high English schools. It was hoped to extend this useful scheme to all districts. An attempt was made to start school clinics in divisional headquarters hospitals. Of 13,113 children examined by the school medical officers, 6,769 were found to have defects. The woman medical officer examined 492 girls of whom 344 were found to have defects.

The chief defects noted were skin diseases, enlarged glands and carious teeth. 3% of the boys had eye diseases, such as trachoma, conjunctivitis, blepharitis and corneal opacity, whilst over 12% suffered from visual defects due primarily to errors of refraction. 2% had heart affections; 24 cases of pulmonary tuberculosis and 10 cases of leprosy were detected.

A special film depicting the causes and prevention of malaria, defective vision, infant and maternal mortality and school hygiene was shown to the students at Ranchi. Although attendance at hygiene lectures was compulsory, the subject was not considered of any importance as hygiene is neither compulsory nor optional in the matriculation examination.

Bengal.

The 41 medical officers, whose services were transferred to the Education Department with effect from 1st March, 1933, inspected 21,140 boys and 550 girls in 183 schools. Of these 4,912 or 23% were ill-nourished; 3,756 or 17% were badly clothed; 747 or 3% had ringworm or scabies; 1,388 or 6% had defective teeth; 638 had nasal disease, chiefly rhinitis. Other defects included enlarged tonsils 1,539 or 7%; adenoids 367; enlarged lymphatic glands 848 or 4%; ottorrhœa 207; respiratory diseases 414; defective speech 176; eye disease 3,484 or 16%; and infectious disease 438. The unvaccinated numbered 306. 43 students were found to be suffering from leprosy in the Asansol Mining Settlement area.

In height the pupils compared favourably with the anthropometric standard, but the average weight was much less than normal. For detailed figures, the annual report of the D. P. H. should be consulted.

Of the 183 institutions examined, 61 had inadequate floor space, 51 had neither privies nor urinals and 57 had no play grounds.

109,693 pupils in 4,468 schools were examined by the rural sanitary inspectors in 23 districts. Of these 9,525 were unvaccinated; 30,232 had enlarged spleen; and 8,659 were inoculated against cholera.

Central Provinces and Berar.

The assistant medical officers in charge of urban dispensaries examined 86,684 boys and 16,162 girls each month. Of these 293 children were found

unvaccinated, 1,152 had enlarged spleen and 2,560 suffered from contagious or other disease. The epidemic dispensary staff inspected 72,579 children in rural schools; of these 1,065 were unvaccinated; 1,991 had enlarged spleen: and 2,224 had contagious or other disease. Unprotected children were vaccinated and those suffering from enlarged spleen and contagious disease were treated in hospitals and dispensaries.

Bombay Presidency.

This province is still without any scheme for the medical inspection of school children, but in 144 schools inspected in Sind by the inspectors of sanitation and vaccination, 5,276 children were found to have enlarged spleen.

Madras Presidency.

The inspection of schools remained in abeyance owing to financial stringency.

Assam.

Periodical medical inspection of selected institutions was carried out by the medical officers in charge and recommendations made for the improvement of the health of the scholars and of the general sanitation of the schools and hostels. The A. D. P. H., Surma Valley and Hill Division, inspected certain schools and delivered lectures on health subjects.

Burma.

Medical inspection of scholars is now left to the option of those anglo-vernacular and English schools which can either provide the cost or can arrange for free medical inspection. Health reports were available in respect of 35 schools and of 10,223 pupils on their rolls, 9,665 or 95% were examined. 70% were reported to be vaccinated; 25% re-vaccinated; 4% had small-pox; and 1% were unprotected. Common disabilities were defective teeth 16%, enlarged tonsils 11%, defective vision 5%, trachoma 4%, anæmia 4% and skin disease 3%.

Fairs and Festivals.

North-West Frontier Province.

49. No untoward outbreak of epidemic disease occurred at any of the fairs.

Punjab.

As usual the sanitary arrangements at important religious and cattle fairs were organised and supervised by the district M. O. Hs., but the A. D. P. Hs. themselves supervised the largest gatherings. Local bodies appreciated the advantages of incineration over the burial of nightsoil and at almost every centre permanent latrines, urinals and incinerators were being constructed. No deaths from cholera were reported.

Delhi.

None of the fairs are large but all passed off uneventfully.

United Provinces of Agra and Oudh.

Medical and sanitary arrangements were, as usual, controlled by the Public Health Department, those of the larger fairs by A. D. P. Hs. and those of the smaller by district health staffs, where available. Preventive measures, such as the cleaning of *mela* sites before and after the fairs, disinfection of wells, medical inspection of pilgrims at important railway stations, segregation and treatment of infectious cases, were carried out with the result that no outbreaks of infectious or epidemic diseases occurred. Medical inspection of returning pilgrims was also carried out to prevent the importation of infectious disease from the Sinhast fair held at Ujjain in the Gwalior State. Temporary regulations under the Epidemic Diseases Act were enforced in certain instances. The officers of the Hygiene Publicity Bureau organised public health exhibitions and gave lantern and cinema health demonstrations at all large gatherings.

The most important fair was the Adh-Kumbh at Hardwar, which occurs every sixth year after a Kumbh. During the year under review, the fair was held in March-April at a time when small-pox was epidemic throughout India particularly in the Bombay Presidency. Arrangements for the inspection of incoming and outgoing pilgrims in co-operation with the railways were made at Saharanpur, Khanalampur, Lakhsar, Hardwar and Rikhikesh railway stations; road inspection posts, first-aid stations and inoculation centres were established in the districts of Bijnor, Saharanpur, Dehra Dun and Garhwal; and a special staff was detailed for the inspection of camping grounds and *dharamshalas*. Although the attendance reached a maximum of 6 lakhs, only 4 suspicious cases of cholera, 4 of plague, 7 of small pox and 3 of measles were intercepted at railway stations; 4 imported cases of small pox were detected at road inspection posts; and 2 imported cases of cholera, 3 cases of small-pox and 6 cases of plague were detected during the *mela* period. In addition 30 cases of diarrhœa with 6 deaths were treated in the infectious diseases hospital.

The Magh *mela*, which was held from 11th January to 10th February, also passed off uneventfully except for 12 infectious cases detected at railway stations in Allahabad.

Bihar and Orissa.

In districts with health organisations, sanitary arrangements are made by local bodies under the supervision of the district M. O. Hs. Important events were however attended by A. D. P. Hs. and a special epidemic staff was detailed by the provincial health department when necessary.

Whilst the sacred Hindu towns of Gaya and Puri attract pilgrims throughout the year, in the former the numbers reach their maximum during the September Patripaksh *mela* and in the latter during the *dhol jatra*, the *snan jatra* and the *rath jatra*. Other important fairs include the Sonepur *Harihar Chatra* cattle fair and the *Bhadra Purnima* at Deoghar. For the management of the *snan* and *rath jatra* festivals at Puri which were attended by nearly 90,000 pilgrims, 3 M. O. Hs. were deputed by the D. P. H. and 3 sub-assistant surgeons were appointed by the municipality. The usual sanitary arrangements and anti-cholera measures included prompt reporting of infectious cases in *dharamshalas*, lodging and private houses; the provision of ambulance carts for the removal of cases to hospital; 38,384 anti-cholera inoculations and treatment with choleraphage. Although sporadic cases of

cholera were occurring at the time in the district, only 8 cases with 1 death were reported in Puri town during the *mela* as compared with 66 and 11 in 1932.

At the Sonepur fair held in October and attended by nearly 1½ lakhs pilgrims, only 3 non-fatal cases of cholera occurred within the *mela* area. An anti-venereal disease campaign was a special feature.

Bengal Presidency.

Except for a few cases of cholera at the Nangalbundh *mela* in Dacca district and 2 imported cases of small pox at the Ganga Sagar *mela* in 24-Parganas district, all the fairs passed off uneventfully.

Central Provinces and Berar.

No epidemic disease was reported at any of the 112 fairs held during the year. Of these 60 were supervised by the epidemic dispensary staff, 1 by the health publicity officer, Berar, and the others by assistant medical officers. Sources of water supplies in the fair areas and on the roads leading to these were permanganated. Isolation huts were provided and all food-stuffs were examined. The assistant medical officers delivered lectures on health subjects.

Bombay Presidency.

At Pandharpur, during the *Ashadi* fair 173 cases of cholera and 1 case of small-pox were admitted to hospital and among the former group 83 deaths occurred. From Pandharpur, cholera infection was said to have been imported into Nasik where 3 cases with 2 deaths were recorded but further spread of the disease was promptly checked. During the Kartiki fair at Alandi, 2 cholera cases were detected of which 1 proved fatal. Other fairs passed off uneventfully.

Madras Presidency.

Most of the 400 festivals occurred during the first half of the year and all passed off smoothly. District and municipal M. O. Hs., as usual, supervised the larger festivals and health inspectors supervised the smaller gatherings. The Public Health Department has gradually extended its sphere of activity to include all minor festivals and special attention is now paid to their sanitary control.

The outstanding festivals of the year were the duodecennial celebration of the Mahamakham at Kumbakonam and the Pushkaram at Bezwada and other centres on the banks of the Kistna. Although attended by nearly a million pilgrims and whilst cholera was prevalent in adjoining districts and in Kistna district itself, these festivals were characterised by an entire absence of cholera or other epidemic disease. This happy result was largely due to elaborate precautionary measures instituted well in advance in co-operation with the Madras and Southern Mahratta Railway administration. Other smaller festivals were held at Bezwada and many other centres and the joint supervision exercised by the provincial P. H. Department and the railway medical authorities played an important part in preventing the spread of infectious disease.

Little or no progress was made with the scheme for permanent sanitary improvements at pilgrim centres, as financial stringency still existed.

Assam.

No very important fairs are held in this province but the smaller centres including the *Sidheswar* and *Bhuban* hill *melas* in Cachar district, the Durranga and *Ambubasi* fairs in Kamrup, the Brahmaputra *snan* festival in Goalpara and the *Parasuram Kunda* festival in the Sadiya Frontier Tract all passed off smoothfully.

Health Propaganda.

Punjab.

50. No whole-time publicity officer was employed but intensive health propaganda was one of the routine duties of the district M. O. Hs. who delivered 6,934 lectures to school children and to audiences at fairs. Much valuable work was also done among women by the Principal, Punjab Health School, and the Inspectress of Health Centres. The most notable feature of the year was the success of the public health section of the Indian Empire Exhibition held at Lahore, which was attended by nearly 5 lakhs of persons. The exhibits formed a compendium of health knowledge, illustrated in such a way as to be easily understood and assimilated by both literate and illiterate. The human struggle for existence and the victory of science over disease were also depicted.

United Provinces of Agra and Oudh.

The Hygiene Publicity Bureau continued its work under the direction of an A. D. P. H. with the assistance of a staff of 2 publicity officers. Municipal and district board contributions towards the publicity campaign being of a voluntary nature decreased to Rs. 4,387.

The Junior Red Cross groups numbered nearly 1,400 with a membership of 50,000. These groups carried out useful community service especially at the time of epidemics. For instance, they collected and persuaded people to be inoculated; they brought cataract cases for operation from outlying villages; they organised health dramas, talks, etc.; they made models; and they devoted time to anti-malarial measures and to quinine distribution.

The publicity van of the provincial branch of the Indian Red Cross Society, equipped with models, films and posters, travelled nearly 5,000 miles and gave 153 cinema shows to audiences numbering over 2·3 lakhs. A health exhibition financed partly by the provincial branch of the Red Cross was organised during the *Adh-Kumbh* Fair, Hardwar. Similar work was carried out at Rikhikesh and Gurukul. Cinema shows were also arranged on many occasions under the auspices of the *Zenana* Park Committee and the Women's Association, Lucknow; during the baby week in Lucknow Cantonment; and to the Indian troops of the Lucknow District. The old posters having ceased to create interest, steps were being taken to prepare new posters of attractive design.

219,654 leaflets, 1,383 sets of posters and 2,286 other booklets were distributed at fairs and other centres.

At the Bureau, first-aid training was given to 14 women supervisors of the Co-operative Department, the students of the sanitary inspectors' class, 46 students and a woman teacher of the Domestic Science School, Lucknow. Lectures were also given on the organisation of hygiene publicity work and the medical inspection of school children to the officers undergoing post-graduate and post-licentiate training, whilst lessons in physical and hygiene training were given to school teachers.

Bihar and Orissa.

The Public Health Bureau as before conducted the usual propaganda work. The A. D. P. Hs. carried lanterns and sets of slides while on tour in rural areas and delivered lectures on sanitation and hygiene. During the S. P. C. A. exhibition at Ranchi, the A.D. P. H., Chota Nagpur and Orissa Circle, demonstrated specimens of disease-carrying germs and insects and showed popular health exhibits. Nearly 1·3 lakhs persons visited the museum maintained by the Red Cross Society.

Bengal.

The 10 propaganda units under the Public Health Department delivered 1,315 lectures to audiences totalling 2,057,700 at 658 places. A few new charts and leaflets on the vitamin and mineral contents of food-stuffs were added to stock. A film entitled "The end of the Feud," representing the benefits of co-operation and organisation in village life, was provided.

Central Provinces.

The 2 health publicity officers and their 2 assistants visited 84 centres, delivered 181 lectures, took part in organising baby week celebrations and assisted with anti-cholera inoculations during epidemics. The dispensary staff also delivered health lectures in their respective areas.

Bombay.

Useful health propaganda connected chiefly with maternity and child welfare was carried out by the 17 sanitary associations in existence.

The Broach sanitary association organised 29 lantern lectures, 6 demonstration lectures in the schools and arranged two health shows. The Ahmedabad association held health exhibitions at baby shows in 11 villages. The Gujerat branch of the Baby and Health Weeks' association organised baby and health weeks at 8 miles; arranged 42 magic lantern lectures; and distributed 10,000 leaflets on plague. Under the auspices of the Bombay sanitary association, lantern lectures on hygiene were delivered to workers living in the *chawls*. The Sind provincial Junior Red Cross Society concentrated chiefly on anti-tuberculosis propaganda and the inspectors of sanitation and vaccination delivered 24 lectures on tuberculosis in rural areas. In Belgaum and Kanara districts, educative propaganda by means of lantern shows was carried out by 2 travelling dispensaries. In Bijapur district, lantern demonstrations were given on cholera, smallpox, plague, malaria and consumption in girls schools whilst 54 health lectures were given in villages by the medical officer of the Red Cross branch.

Madras.

The cinema now occupies an important place in health education and several portable cinema sets have been provided for the district health staffs. Two 4-reel films entitled " Never say die " dealing with leprosy and " Better late than never " dealing with tuberculosis were produced, the latter with money provided by the Health Propaganda Board. A new set of coloured lantern slides on leprosy, a pamphlet on food and popular dietaries and a number of lithographic coloured posters on tuberculosis and cholera were issued. The acetylene projection lantern presented practical difficulties but successful results were obtained with the baby petromax light.

The propaganda section of the Public Health Department organised health exhibitions at Kumbakonam and Bezwada during the *Mahamakham* and *Pushkaram* festivals and a special section of public health was arranged at the Park Fair Exhibition in Madras.

32,973 lectures, 16,149 magic lantern demonstrations, 96,584 short talks and 719 cinema shows were given to audiences totalling nearly 7·5 millions. In addition to these, 699 health dramas were enacted and 1,707 health exhibitions were conducted.

Assam.

In some districts, owing to financial stringency, health propaganda was restricted to the distribution of leaflets on leprosy and tuberculosis. In the districts of Cachar and Sylhet, active propaganda was undertaken during the severe epidemic of cholera which occurred there. The remarks of the D. P. H. are quoted below as they sound a note of warning to those concerned.

" The present state of health education is so deplorably primitive in the province that it will take years of patient work to instil the principles of health. The stoppage of health propaganda in the province was a most regrettable step and the amount of harm done thereby has been incalculable."

Burma.

Health propaganda was carried out in nearly every district. Members of the health staff gave 5,566 lectures and health talks in rural areas and 421 in urban areas ; 173 lantern demonstrations and 16 cinema shows in rural and 41 lantern demonstrations in urban areas ; and distributed 183,164 copies of health publications.

The post of the Hygiene Publicity Officer remained in abeyance and the Bureau was in charge of a sub-assistant surgeon. Intensive health educational work was organised in epidemic areas in the districts of Magwe, Shwebo and Bassein, this including 76 lectures and 84 cinema demonstrations on health subjects to audiences totalling 80,000 and the distribution of 55,368 copies of health publications.

A film entitled " Safety first," dealing with small pox, was produced and it was also hoped to produce a plague film. Various new hand bills and pamphlets were added to the stock maintained by the Bureau. A number of old pamphlets were revised and reprinted and the number of these issued totalled 587,314, whilst 63,000 copies of the pamphlets on rabies and care of the teeth were distributed in schools.

The tenth Rangoon health week exhibition was arranged in different sections, each dealing with a specific phase of public health. In the women

and children's section, replicas of free and private wards in the Dufferin hospital were shown ; and an exhibit dealing with the feeding of toddlers showed diets suitable for children of different ages. The dental hygiene section contained models, charts and diagrams illustrating dental diseases and their prevention, whilst the Harcourt Butler Institute of Public Health provided a series of technical exhibits. The malaria section showed 4 groups of models illustrative of insect-borne diseases. A health play, a health *pwe* and the exhibition of cinema films were additional features worthy of mention.

Industrial Hygiene and Mines.

51. *General.*—The daily average number of persons working in and about mines regulated by the Indian Mines Act, 1923, was 206,507 ; of these 171,038 were men and 35,469 women. 112,355 persons worked underground, 41,587 in open workings and 52,565 on the surface. 144,707 persons were employed in coal mines and 61,800 in metalliferous mines. Women employed underground numbered 12,799, or 11% of the total ; these included 12,689 in coal mines ; 110 in salt mines ; 10,721 in open workings ; and 11,949 surface workers. Of the total women working underground in coal mines, 7,292 were employed in B. & O., 4,551 in Bengal and 846 in the C. P.; the remainder were employed in the salt mines in the Punjab.

In *Bengal and B. & O.*, the low prices of food-stuffs helped to alleviate conditions. The general health of workers in the Raniganj and Jharia Mining Settlements was on the whole satisfactory ; cholera incidence generally decreased but smallpox increased in the Jharia coal-fields. In the Asansol Mining Settlements concentrated efforts at vaccination and revaccination, prompt isolation and segregation checked the spread of smallpox. Cholera and smallpox were prevalent in Chota Nagpur.

In the *C. P.*, the Pench Valley Coalfield recorded decreases in the incidence of malaria and smallpox.

In the *Punjab*, a serious outbreak of malaria followed heavy monsoon rains. Underground latrines were provided at Khewra.

In *Burma*, the anti-malarial measures at Namtu and Bawdwin were successfully continued and general health conditions there and at Tavoy and Mergui were good.

142 persons died from accidents and 655 were seriously injured. Figures for accidents among men and women in underground and open workings and on the surface are given in Table IV (*iv*) :—

TABLE IV (*iv*).

	Fatal accidents.	Killed.		Rate p. m. employed.		Serious.	Injured.		Rate p.m. employed.	
		M.	F.	M.	F.		M.	F.	M.	F.
Underground .	113	106	16	1·1	1·2	512	483	43	4·8	3·4
Open workings .	14	13	3	0·4	0·3	22	12	11	0·4	1·0
Surface . .	15	11	4	0·3	0·3	121	110	11	2·7	0·9

M.—Male. F.—Female.

Classes in first-aid were held as usual ; 96 of the 166 persons who attended the 11 centres in the Jharia coal-fields and 123 of the 177 trained at the 8 centres in the Raniganj coal-fields obtained certificates. First-aid classes were also held at other important mining centres.

The total number of factories at work was 8,452, of which 3,933 were perennial and 4,519 were seasonal. The average number of persons employed further fell from 1,419,711 to 1,403,212. Women workers numbered 216,837 and children 19,091, these representing 12% and 4% of the total factory population. Recorded accidents included 194 fatal, 3,776 serious and 14,739 minor. Safety committees have been established in some factories. Progress continued to be recorded with housing schemes in the U. P. and especially in the new sugar factories in Bombay and Bengal. The general health of factory employees was reported to be normal and no dislocation of industry occurred from epidemic disease. A sanitary inspector was appointed in the Western India Match Factory at Tiruvottiyur (Madras) for anti-malarial work. A factory in Bombay manufacturing lead accumulators appointed a medical officer. The cleanliness of factory surroundings was reported to be generally well maintained and sanitary arrangements in the larger concerns were said to be satisfactory. The disposal of waste products in Sind rice factories received attention. In the U. P., the disposal of trade waste of sugar factories, particularly in rural areas, presented a difficult problem and received considerable attention. The dust nuisance in the rice mills in Burma has not yet been overcome.

The ventilating and cooling systems installed in the Ahmedabad mills worked for the greater part of the year and greater attention was devoted to their maintenance. Improvements were also being gradually effected in the older mills and smaller factories in Ahmedabad and Bombay. Several small factories in Bombay introduced improved ventilation by means of mechanical air paddles or by electric fans; problems connected with the prevention of dust or fume inhalation also received attention. In Bengal, the question of finding a cheap and satisfactory method of preventing or reducing dust in rice mills and in the tea, jute and cotton factories was further considered but although a satisfactory solution was found in mechanical exhaust systems, the expenditure involved was considered prohibitive. Two cotton mills in the U. P. completed the installation of central ventilating and cooling plants and these have appreciably improved working conditions. In B. & O., attention was paid to the reduction of dust from mustard seed sifters in oil mills. In the Punjab, improvements in ventilation were effected where factories were rebuilt or altered. The fact that the majority of factories are situated in open spaces makes natural ventilation more simple. In perennial factories in the C. P., considerable improvements have been made to secure adequate ventilation, not only by the provision of additional ventilation openings but by the use of exhaust fans. The dust nuisance in cotton gins and presses and, to a lesser extent, in rice mills still continues. Air-conditioning systems have been installed in the fermenting and rolling rooms in a number of tea factories in Assam.

Owing to trade depression, welfare work generally made little advance, but previous activities were usually maintained. The 104 creches established in the factories of the Bombay Presidency have been of great benefit and a general rise in their standard has occurred during the last few years. Health exhibitions were held in several mill compounds and these were attended by large numbers of employees and their wives. In Bengal, welfare work was generally confined to the improvement or extension of work already in progress, for example, additions were made to medical and welfare staffs, and facilities for recreation were improved. In the U. P., existing welfare work was continued but special mention must be made of the activities of the British India Corporation and Messrs. Begg, Sutherland and Company. No new schemes were started in the Punjab or the C. P. Creches do not appear

to be popular with the operatives in the latter province. The Delhi Cloth and General Mills continued their useful welfare work during the year. Additional information is included in the following paragraphs.

Delhi.

A total of 60 factories and other concerns were at work ; of these 2 maintained a dispensary under a medical officer; 7 subsidised private medical practitioners ; and only 2 provided M. & C. W. centres. 59 had tap water supplies.

United Provinces.

All district and municipal M. O. Hs. are *ex-officio* inspectors under the Indian Factories Act. From October 1933, district M. O. Hs. were invested with powers, under sections 33 and 35 of the tea districts Emigrant Labour Act, 1932 (Act XXII of 1932), to segregate and treat infectious cases detected among persons proceeding to the tea gardens.

Bihar and Orissa.

The D. P. H., and the A. D. P. Hs., South Bihar & Chota Nagpur *cum* Orissa circles, were appointed under the Government of India notification No. M-1265, dated the 20th April, 1933, as *ex-officio* medical inspectors of mines under section 4 of the Indian Mines Act, 1923.

Among the colliery population of 128,241, 1,864 births and 1,016 deaths were recorded, giving rates of 15 and 8 *p.m.* The chief causes of sickness were influenza 4,292 cases, smallpox 394 and cholera 36. Influenza caused 29, smallpox 15 and cholera 7 deaths.

In the whole area, the estimated population was 516,164 ; 28 deaths from cholera, 74 from smallpox and 29 from influenza were recorded. In the course of the year 5 additional collieries were connected to the Jharia water board supply bringing the total number of connected collieries to 173, whilst 13 water tanks were kept in reserve as a precautionary measure against cholera. Conservancy and drainage received attention.

Four maternity and child welfare centres were at work, the staff consisting of 2 health visitors and 5 midwives. Training of indigenous *dais* also received attention.

An allotment of Rs. 1,500 was sanctioned by the Board for anti-leprosy work. Clinics were held weekly at Jharia, Katras and Dhanbad ; attendances numbered 713 new cases.

Bengal Presidency.

Asansol Mines Board of Health.—Births totalled 11,986 and deaths 6,989. The infantile mortality rate was 137 per 1,000 live-births. Smallpox was the cause of 247 cases with 33 deaths ; 17,196 primary and 15,362 re-vaccinations were performed. Only a few sporadic cases of cholera occurred and these were traced to imported infection. 114 deaths were ascribed to malaria and 3,013 deaths to total fevers. Deaths from respiratory diseases totalled 873, those from influenza 12, pneumonia 455 and pulmonary tuberculosis 95. The maternity and child welfare scheme was in charge of a woman superintendent ; and health and baby welfare celebrations were organised at

7 centres by the Asansol Health and Baby Welfare Society. The Board's school medical officer examined 3,867 boys and 339 girls in 54 schools.

Central Provinces and Berar.

In perennial factories and mining camps, water supplies were adequate and sanitation was on the whole satisfactory whilst the general health of operatives was good. Except for the mining camps in the districts of Chhindwara and Chanda, there was no outbreak of epidemic disease but dust nuisance continued in the cotton ginning factories and rice mills. In Chhindwara, there were 540 cases of influenza with 2 deaths, and 7 non-fatal cases of smallpox. In the Ballarpur colliery in Chanda district 322 cases of influenza were recorded. The main colliery hospital at Parasia and the dispensaries at the Mahakota and Ballarpur collieries continued to render medical aid to the mines, labourers and their families.

Bombay Presidency.

Under the Factory Act of 1911, A. D. P. Hs. carried out factory inspections during the course of their tours. The disposal of foul water and the removal of dust in rice factories received attention. The statutory limewashing and painting of factories was generally complied with.

In accordance with the recommendation of the Royal Commission on Labour, the officers of the provincial Public Health Department were appointed *ex-officio* inspectors of mines.

Madras Presidency.

The health of mines' employees in the districts of Cuddapah, Kurnool, Nellore, the Nilgiris, Salem, Trichinopoly and Vizagapatam was satisfactory and no epidemics occurred. Health officers inspected 216 factories under the Indian Factories Act.

The recommendation of the Royal Commission on Labour in respect of the appointment of an A. D. P. H. for the investigation of problems associated with industrial hygiene was under consideration of the provincial government.

Factories driven by electric motors of more than 15 horse power continued to be constructed outside industrial areas. Constant efforts were made to get local bodies in consultation with their health officers and the Director of Town Planning to demarcate industrial areas and to exercise a more strict control over factories.

Assam.

Special regulations under the Emigration Labour Act, 1932, were in force in regard to the supervision of sanitary conditions of tea estates and sanitation was stated to be generally satisfactory. Factories were controlled under the Indian Factories Act. As oil and rice mills were rapidly increasing in numbers, it was deemed advisable to have these built outside town areas as far as possible. The Civil Surgeons, Lakhimpur and Naga Hills and the A. D. P. H. were *ex-officio* inspectors of mines.

Burma.

Burma Corporation Ltd., Namtu.—The health of employees was generally satisfactory. Figures recorded included 1 non-fatal case of anthrax; 5,606 cases with 44 deaths from malaria; 13 cases of epidemic dropsy; 1 fatal case of diphtheria; 16 cases with 1 dealth from smallpox; 41 and 9 from enteric fevers; 75 and 30 from pneumonia; 290 and 5 from dysentery; 64 and 25 from tuberculosis of the lungs; and 16 cases of hookworm. Cholera was absent. Attempts to trace the source of anthrax infection were unsuccessful. Although the malarial incidence decreased, its prevalence was ascribed to the infection of Chinese coolies in the neighbouring districts. Epidemic dropsy occurred only among the Chittagonians and Bengalees who were using polished rice. Smallpox infection was imported from a village near the Chinese frontier. The enteric cases were confined to Chinese and Indians but the source of infection was not traced. These 2 communities also offered poor resistance to pneumonia. Dysentery is usually amoebic in type; but this year one death was ascribed to the bacillary type. Cases of "open" tuberculosis with T. B. in the sputum and advanced cases with emaciation not showing T. B. in the sputum are isolated and taught elementary hygiene. All newcomers found to be infected with hookworm are treated. The sanitary state of the area was satisfactory. The maternity and child welfare scheme continued to flourish and medical inspection of school children was carried out.

Tavoy District.—The general health was good. A piped water supply has been provided in all the mines except for a few months when shallow wells were used. Several big mines maintained hospitals; first-aid apparatus and drugs for minor ailments were provided by other concerns. Industrial diseases were absent; malaria prevailed during the rainy season.

Thaton District.—Housing conditions continued to be of a low standard. Latrine accommodation was not provided.

Adulteration of Food.

N.-W. F. P.

52. The Punjab Pure Food Act, 1929, and the N.-W. F. P. Pure Food Rules, 1931, were in force but they have not yet been applied to 2 towns. Of the 95 samples of *ghee* and 60 samples of milk examined at the provincial laboratory, 56 and 31 were found to be adulterated.

Punjab.

A total of 250 samples, including 36 of milk, 52 of *ghee*, 12 of sago, 15 of other foods, 81 of water, 6 of sewage effluents, 8 of quinine sulphate, 5 of disinfectants and 35 of other articles, were examined at the public health chemical laboratory. 30% of the water samples were found unfit for drinking purposes and 64% of the samples of milk and 46% of *ghee* were found adulterated. None of the samples of quinine sulphate showed any adulteration.

As suggested by the Royal Commission on Labour in India, standards of purity were worked out with a view to the provision of a clause in the Punjab Pure Food Act, 1929, for the better regulation of the sale of condensed skimmed milk.

In addition, 1,904 samples of milk and 77 of *ghee* were examined during the Sun Eclipse Fair at Kurukshetra. Of the former, adulteration varied

from 65% on the first day, 22% later on and 3·5% on the last day of the fair, whilst 9% of the *ghee* samples were found adulterated.

United Provinces.

The Prevention of Adulteration Act was in force in all the 85 municipalities, in 28 notified areas, in 5 rural districts and in several towns and rural areas in 21 districts. 5,429 samples were received for analysis; these included 3,049 of *ghee*, 1,488 of milk, 580 of edible oils, 78 of butter, 71 of flour, 26 of vegetable products and 137 others. Of the total, 799 were certified as adulterated and 4,533 as genuine; the remaining 97 were unfit for examination. The percentage of adulterated samples fell from 20% in 1932 to 15%.

Bihar and Orissa.

Of samples examined at the Public Health Laboratory 42% of *ghee*, 42% of mustard oil, 71% of sweets and 37% of milk were found to be adulterated.

Bengal Presidency.

The report of the Bengal Public Health Laboratory has not been received but in the Department of Public Health Laboratory Practice in the School of Tropical Medicine, Calcutta, research work was carried out on (*a*) the detection of sewage contamination of water; (*b*) radio-activity of waters and their influence on bionomics; (*c*) saponification value of fats and oils by saponification at room temperature; (*d*) nutritive value and constants of mustard oil, and (*e*) detection of adulterants in mustard oil by the lead soap method.

At the Dacca Branch Public Health Laboratory, 364 samples of water were examined chemically and 1,178 bacteriologically. A total of 5,087 samples of food-stuffs were analysed; of the 3,523 samples received from 7 district boards and 1,282 from 19 municipalities within the jurisdiction of this laboratory, 50% and 45% respectively showed adulteration; 89% of the samples of *dahi*, 80% of butter, 69% of milk, 48% of mustard oil and 43% of *ghee* were adulterated.

Central Provinces and Berar.

The Public Health Institute carried out the analysis of various food-stuffs. Five samples of butter and 1 of *ghee* were examined; all were adulterated.

Bombay Presidency.

The Bombay Prevention of Adulteration Act, 1925, was in force in Karachi, Ahmedabad and Surat. The question of appointing public analysts at Shikarpur, Sukkur and Hyderabad was under consideration. The public analyst, Karachi, examined 1,522 samples of food-stuffs in addition to 156 samples of *ghee* for the use of Asiatic crews under the Indian Merchant Shipping Act.

Madras Presidency.

In G. O. No. 1982-P. H., dated the 6th September, 1933, the Food Adulteration Act was extended to all municipalities employing M. O. Hs. and from 1st December, 1933, to a few other municipal towns. Of the 2,613 food samples examined, 843 were found adulterated.

Assam.

108 samples of water, 274 of milk, 78 of *ghee*, 1 of butter, 81 of mustard oil, 14 of other food-stuffs and 14 of rice were examined at the public health laboratory, Shillong, and of these 98 of milk, 43 of *ghee* and 41 of mustard oil showed adulteration.

Burma.

The food samples examined at the Harcourt Institute of Public Health, Rangoon, included *ghee* 102, milk 31, oil 38, *atta* 5 and butter 4. Of these 7 of *ghee*, 9 of milk, 10 of oil and 2 of butter were adulterated.

The post of Public Analyst was abolished in August, 1933, and the examination of food-stuffs for government departments and under the *Ghee* Adulteration Act was transferred to the Chemical Examiner.

Railways.

Bombay, Baroda and Central India Railway.

53. Under a chief medical officer, this railway employed 7 district medical officers, 69 assistant and sub-assistant medical officers, 58 compounders, 2 matrons, 6 nursing sisters, 5 nurses, 1 drug inspector and 1 anti-malaria inspector. In addition, a number of civil surgeons and other medical officers were subsidised for services to the railway staff. Out of 357,591 new cases treated at railway dispensaries during 1933-34, causes of sickness were available in respect of 351,824 cases only; air-borne cases totalled 52,282, food and waterborne 38,215, insect-borne 61,891, infectious diseases 707, pyrexia of uncertain origin 18,318, diseases of direct contagion 935, food deficiency 16, injuries 30,303 and other causes 149,157. 11,810 surgical operations were performed. 370 X-ray examinations were carried out at Ajmer and Freelandganj.

Cholera was absent; 8 cases of plague with 4 deaths were recorded, all among unprotected members of the families of employees. Most of the 220 cases, with 21 deaths, of smallpox occurred amongst the families of employees who were either unsuccessfully vaccinated or bore only one mark; 102 cases with 4 deaths occurred among the vaccinated and 118 with 17 deaths among the unvaccinated. Other infectious diseases included 240 cases of mumps, 102 of measles, 83 of chicken-pox, 2 of diphtheria and 1 of enteric fever.

The anti-rat campaign and the usual anti-malarial measures were continued. A total of 9,808 vaccinations against smallpox, 122 inoculations against typhoid, 437 against plague and 3,513 against cholera were performed. 257 persons were given anti-rabic treatment at the Ajmer Railway Hospital and 75 at other non-railway centres.

14 first-aid training classes were held and 62 out of 105 candidates obtained certificates and 1 obtained a voucher; 17 were trained in home nursing.

Madras and Southern Mahratta Railway.

Indoor attendances at the 5 hospitals during 1933-34 were, Perambur 1,869, Hubli 946, Guntakal 511, Bezwada 214 and Vasco-de-Gama 77. 479 major operations were performed. First-aid posts dealt with 593 accidents and 12,098 cases of minor ailments.

Of a total of 288,398 cases treated during 1933-34, malaria accounted for 6,020, dysentery 4,376, diarrhœa 2,795, typhoid fever 88, measles 54, smallpox 120, plague 20, cholera 11 and accidents and other diseases 274,914. Although the number of malaria cases increased, the sick days lost on account of this disease decreased as a result of energetic anti-malarial measures. Anti-cholera and anti-plague inoculations numbered 8,246 and 6,828 respectively and 9,825 vaccinations against smallpox were performed.

In the past little attention was paid to the problem of leprosy amongst railway employees but during the past year much consideration has been given to the formulation of a scheme for the treatment of such cases. An attempt was made in the Bezwada district to treat employees who had after examination been declared as lepers. At Bezwada, it was found that a railway hospital is unsuitable for the treatment of lepers, as the ordinary patients object to their admission. In this railway centre the experiment was made of granting leprotic patients prolonged leave on the understanding that they underwent suitable treatment; they were taken back to duty when declared uninfective. A few cases have been treated in this manner.

Another scheme is now proposed whereby lepers will receive out-patient treatment at Perambur. So far this has not been fully worked out but it is evident that a special building for treatment will be necessary. It is proposed that whilst under treatment an employee will draw a certain proportion of his salary until he is pronounced non-infective and is fit to return to duty. An effort will be made to bring all leprotic employees, whose number is probably much larger than is generally apparent, under treatment. At present cases are sent to the leper colony at Chingleput or to a Government institution.

Like leprosy, pulmonary tuberculosis presents a difficult problem. In both conditions prolonged treatment is necessary, but in tuberculosis institutional treatment is called for and facilities for this are limited. In any case, only a small number of the worst cases can be treated in railway hospitals as the necessary accommodation is not available. Moreover, climatic factors, especially in Madras, are harmful and methods of living are unfavourable and all that can be done is to give hospital treatment to those cases presenting active lesions and to grant long periods of leave. It is highly desirable that a scheme for the treatment of this disease should be formulated, especially for early cases. Such a scheme would necessarily include sanatorium treatment at some climatically suitable centre.

Of 348 employees examined in ambulance work, 225 passed the test.

A child welfare centre under a woman health visitor was at work at Perambur; the midwives attached to this centre conducted 139 railway and 37 other maternity cases.

South Indian Railway.

A total of 43,594 cases were treated including 16,848 due to infectious diseases; labour cases numbered 24. The total loss on account of sickness

was 280,006 days or an average of 6·4 days per head. The death rate amongst employees was 3·5 *p.m.* Plague was absent; influenza was responsible for 5,636 cases and the number of days lost through this cause was 32,398. Cases of dengue numbered 41, cholera 3 with 1 death and smallpox 165 with 13 deaths. Vaccinations totalled 1,410. Water supplies were treated with bacteriophage but results did not provide conclusive evidence in favour of its use.

Sanitary and conservancy arrangements were on the whole satisfactory. The ambulance course was improved; 210 employees completed the full course of lectures in first-aid and 99, including 5 officers, passed. Medical examination of school children was continued.

Great Indian Peninsula Railway.

To meet the medical and sanitary needs of a population of 85,184 spread over 3,627 miles of railway line this railway maintained in addition to the chief medical officer, 11 district medical officers, 2 assistant medical officers, 21 assistant surgeons, 38 sub-assistant surgeons, 6 matrons, 20 nursing sisters, 5 nurses, 2 health assistants, 25 sanitary inspectors, 1 malaria overseer and 49 dispensers. The cost of medical services aggregated Rs. 6,00,454 and that of health services Rs. 4,07,190.

112,395 employees, 67,162 members of their families and 4,904 other cases were treated at the different dispensaries, whilst the daily average attendance of employees at hospitals and dispensaries was 1,331. The number of days lost due to certified sickness was 648,979 or 8 days per employee, the resultant financial loss amounting to Rs. 10,54,696. The most important causes of sickness were malaria and "other fevers," nearly 9% of the total strength suffered from malaria and 16% from other fevers.

Table IV (*v*) gives the incidence of malaria and fevers at certain centres.

TABLE IV (*v*).

	Malaria.	Fevers.	Per cent. to total strength.
Total	**7,529**	**20,835**	**8·8**
Bhusaval	2,523	4,469	25·3
Igatpuri	956	2,582	15·1
Bombay	1,466	5,452	5·3
Sholapur	474	1,416	7·5
Jhansi	1,190	3,346	7·0
Jubbulpore	399	1,306	5·3
Nagpur	521	2,264	5·0

The incidence of malaria was as usual highest in October and lowest in March. Routine anti-malarial measures were carried out. Influenza prevailed throughout the year. 7,779 inoculations against plague, 6,647 against cholera and 12,514 vaccinations were performed. X-ray plants were at work at Byculla, Bhusaval and Jhansi.

A total of 1,370 live-births, giving a birth rate of 12 *p.m.*, was recorded. Deaths numbered 604, the death rate being 5 *p.m.* The infantile mortality rate within railway premises rose to 192 per 1,000 births; Bombay district recorded the highest rate, 307, and Bhusaval district the lowest, 74. 30 still-births were recorded.

At the anti-rabic treatment centres at Byculla, Bhusaval and Jhansi, 21, 242 and 81 cases respectively were treated.

Accident relief medical equipment was maintained at 37 railway stations and 423 first-aid boxes were supplied to the transportation department. 51 classes in first-aid were held and of the 388 candidates, 246 obtained certificates, 8 vouchers and 2 medallions.

Eastern Bengal Railway.

The medical and health staff included a chief medical officer, 3 district medical officers, 1 malariologist, 1 bacteriologist, 1 assistant medical officer, 13 assistant surgeons, 50 sub-assistant surgeons, 58 dispensers, 8 nurses, 21 sanitary inspectors, 1 malaria inspector, 3 assistant malaria inspectors and 10 sub-assistant malaria inspectors.

The number of days lost on account of certified sickness of the staff increased from 266,205 to 281,290. 16 hospitals with a total of 187 beds treated 2,735 indoor cases or 15 per bed. The new hospital at Sealdah will increase indoor accommodation by 30 beds. Surgical operations totalled 3,284. Anti-cholera inoculations numbered 2,153 and vaccinations 13,554.

Table IV (*vi*) gives the cases treated.

TABLE IV (*vi*).

	Cases.	
	1933-34.	1932-33.
Total cases	**110,886**	**103,563**
Cholera	**10**	15
Smallpox	**26**	91
Influenza	**11,135**	8,803
Dysentery	**2,282**	1,594
Enteric Fever	**114**	106
Gonococcal infection	**80**	95
Syphilis	**69**	62
Malaria	**8,899**	8,657
Kala-azar	**103**	96
Tuberculosis	**58**	109
Leprosy	**5**	9
Hookworm	**40**	9
Other worms	**468**	288
Injuries	**10,504**	11,068
Diseases of ear	**2,862**	3,030
Diseases of eye	**4,348**	4,511
Diseases of nose	**497**	404
Other causes	**69,386**	64,616

No outbreak of epidemic disease occurred. All cases of clinical malaria were examined microscopically ; of 17,852 blood films examined, 5,498 were positive. Efforts were made to obtain accurate figures of proved malaria cases over the whole railway system with the idea of obtaining a census of malaria-infected employees.

Arrangements were made with the Pasteur Institute, Calcutta, for the treatment of dog-bite cases. Of the 213 persons trained in first-aid, 141 obtained certificates and 7 medallions.

The bacteriological laboratory at Calcutta examined 4,392 blood specimens, 158 sputa, 528 urines, 158 stools and 57 others ; whilst 28 autogenous vaccines were prepared, 237 samples of water were analysed and 7 specimens were tested for blood sugar. The laboratories at Kanchrapara, Saidpur and Lalmonirhat carried out similar work.

SECTION V.

MEDICAL INTELLIGENCE AND INTERNATIONAL HEALTH INCLUDING PORTS.

Epidemiological Intelligence.

54. The office of the Public Health Commissioner continued to act as the epidemiological bureau of the Government of India. Issues of epidemiological returns included :—

(1) Weekly statistics of reported attacks and deaths from the major epidemic diseases in British India and Indian States ;

(2) A weekly epidemic diseases bulletin containing a summary of epidemiological information concerning both India and foreign countries and other items of special interest to health officers. Part I is concerned with India alone and has a wide distribution ; Part II, which for the most part includes information from outside India, is distributed in India only and consists of 6 sections dealing with vital statistics, quarantinable diseases and other health matters under the following categories :—

(*a*) The latest weekly wireless statement of the League of Nations, Health Organisation, Eastern Bureau, Singapore, as broadcast from Saigon and Malabar (Java).

(*b*) Epidemic disease incidence of foreign countries and ports, excluding Great Britain and the United States of America.

(*c*) The latest weekly information from Washington of deaths from all causes in certain large cities of the United States of America.

(*d*) Extracts from the weekly statement on England and Wales issued by the British Ministry of Health.

(*e*) A list of foreign countries and ports in which known or suspected cases or deaths from cholera, smallpox, plague, typhus and yellow fever occurred during the 12 weeks ending the period to which the weekly summary relates, and

(*f*) Notes on public health matters ; communications from the " Office International " ; proceedings of the Quarantine Commission of the " Office International " ; articles on port health, etc. ;

(3) Weekly mortality figures of certain diseases including " conventional " diseases in the chief sea-port towns ;

(4) Weekly recorded vital statistics in respect of towns in British India having a population of 30,000 and over ;

(5) Weekly cables to the British Ministry of Health and the Eastern Bureau of the League at Singapore, giving a review of the epidemiological conditions in ports as well as the interior of provinces. Additional information is sent to the latter by post in regard to (*i*) infected ships arriving at Indian ports, (*ii*) ports in India declared infected and (*iii*) infected rats. The former includes this information in its weekly record of infectious diseases of ports ; the latter incorporates the information in its weekly broadcasts issued from Saigon and Malabar ;

(6) In accordance with the requirements of the International Sanitary Convention, 1926, periodical reports to the Eastern Bureau of the League in regard to conventional diseases under articles 1, 2, 4, 6, 9, 12, 14, 16, 28, 50 and 57 of the Convention ;

(7) Quarterly Abstract of Vital Statistics in British India and Indian States ;

(8) On request from the Health Section of the League at Geneva, statistical data in regard to notifiable diseases ; and a quarterly review of the incidence of certain diseases in British India to the International Statistical Institute, the Hague.

Of these, Nos. 1, 4 and 7 are also published in the *Gazette of India*.

General.

55. The activities of the Office International d'Hygiene Publique and the Health Section of the League of Nations are as usual described in some detail in so far as they concern the bi-annual meetings of the former in Paris on the one hand and the Singapore Bureau, the Health Committee of the League of Nations and its various Commissions on the other.

Office International d'Hygiene Publique, Paris.

56. (A) In the absence of Major-General Graham, the usual delegate of the Government of India, Lt.-Col. A. D. Stewart, I.M.S., Director, All-India Institute of Hygiene and Public Health, Calcutta, attended the spring session.

The more important items dealt with are summarised in the following paragraphs :—

(*a*) *The Cholera Commission* discussed (*i*) the preparation of a standard agglutinating serum for cholera vibrios and (*ii*) cholera carriers. In regard to (*i*) 3 contributions were considered, *viz.*, (*a*) a preliminary note " On the recognition of the cholera vibrio by microbiological methods and the choice of an antigen for the preparation of an agglutinating serum " by Dr. J. Cantacuzene in which he emphasized the necessity for some international agreement as to the characters and qualities which should be accepted as constituting a " cholera vibrio" and to the employment only of such vibrios as antigens in the preparation of agglutinating sera ; (*b*) Col. Stewart's paper " On the preparation of a standard agglutinating serum for the cholera vibrio " ; and (*c*) a note by the delegate of the U. S. A. on " The results of experiments done in the Philippines with the agglutinating serum for the cholera vibrio prepared by Dr. Madsen ". In regard to the preparation of a standard agglutinating serum, Drs. Madsen and Cantacuzene prepared sera from authentic and stable strains in their possession at the Danish State Serum Institute and at Bucharest ; these were tested in several laboratories in India, the Philippine Islands, Indo-China, Egypt, Syria and Europe. Although the reports received showed that the trial of the sera on standard cultures did not always produce the same agglutination results, it was proposed to review the whole position later on receipt of reports from all participating countries. As India offered favourable opportunities for the preparation of a standard cholera serum, the attention of Indian workers was drawn to this problem and the suggestion was made that

" Office "—Office International d'Hygiene Publique, 195, Boulevard Saint Germain, Paris.

I. S. C.—International Sanitary Convention.

agglutinating sera should be prepared in the laboratories in India and then sent for tests to Drs. Madsen and Cantacuzene. The delegate for India was also requested to arrange for tests of the sera sent by these doctors particularly on vibrios isolated (*i*) at the beginning, (*ii*) during the height of and (*iii*) during the decline of an epidemic.

Cholera Carriers.—Ever since Greig in 1913 described a jail epidemic of cholera in India as due to a healthy carrier of agglutinable cholera germs, countries like Egypt and Syria have viewed with apprehension the entry of such healthy carriers into their territories. During the epidemic of cholera in Iraq in 1931, travellers from Iraq to Syria and Egypt were compelled to be in possession of certificates stating that their stools had been examined twice for true cholera germs and had been negative. In the alternative, they were detained,—latterly whether they had been inoculated or not,—and were submitted to two examinations. Not until negative results were obtained were they allowed to proceed. Numerous carriers of agglutinating vibrios were found amongst travellers coming from Iraq and latterly amongst persons coming from territories bordering on Iraq, even though such places had never been affected with cholera. Numerous carriers of A. G. vibrios were also found amongst inoculated persons. Such carriers were found to be quickly freed of A. G. vibrios either by taking bacteriophage or a killed emulsion of cholera vibrios by mouth. On the other hand, since Greig published his work, practically no other instance has arisen where a healthy carrier has been incriminated as having caused an outbreak of cholera unless he was in the incubating stage of the disease. Japanese workers and others hold that there is no knowing when a healthy carrier may develop the disease clinically and so spread it. Such a case is, therefore, in their view always a potential danger. The healthy carrier state, however, does not seem to last long naturally and it may be shortened, as stated above, by the ingestion of phage or dead emulsion by mouth. The following seem to represent the various opinions held at present :—

(1) Cholera is carried by those who void A. G. vibrios, either incubating carriers, actual cases, or convalescent carriers (for a short time). The question of carriage or spread by healthy carriers is controversial.

(2) Healthy carriers (*i.e.*, those who have never had the disease) of agglutinating vibrios have practically never, or very seldom, been shown to spread the disease *unless they actually develop the disease* (incubating carriers).

(3) Persons who have been inoculated against cholera may become healthy carriers, but are never likely to develop the actual disease ; and so are really harmless probably in themselves, *but*

(4) They may void A. G. vibrios and so infect other people who, in their turn, may become healthy carriers, or may develop and spread the actual disease.

(5) Therefore inoculated persons who are healthy carriers may be dangerous and cannot be neglected, nor (in the opinion of those who hold the views in 4 above), can they be excused the necessity of examination.

(6) If *everyone* were inoculated, the danger would be reduced to a minimum.

The delegate for India, on request, gave his opinion as regards experiences in India as follows :—

" In my opinion the word " cholera carrier " was unfortunate and its loose use had created a wrong impression especially amongst those who were unacquainted with the literature and work. The word " carrier " should be applied to a person *capable of producing the disease* and in this sense the " healthy carrier " has seldom or never really been incriminated. Our experience in India has been different from elsewhere ; we have not found carriers of agglutinating vibrios to any extent either in endemic or epidemic areas though N. A. G. carriers have been found amongst the general population in endemic areas in comparatively large numbers. Such epidemics as had been traced with extreme care (such as the Sibsagar epidemic in Assam and others in the United Provinces) have always been found to be due to an acute case or an incubating case. Greig's classical case of 1913 had been criticised (see Colonel Morison's note submitted to the present session). In my opinion there would probably prove to be some essential difference in the carriage of cholera in endemic and epidemic areas in India. Careful and detailed examination of epidemics in both classes of area was desirable and this work had been specially envisaged in the programme of the Cholera Commission proposed by the I. R. F. A. The measure laid down in the Convention of 1926 for the Hedjaz Pilgrimage (which gives special facilities to inoculated persons) had apparently proved sufficient in late years in preventing the entrance of cholera to the pilgrimage and this being so, the neighbouring countries might be content with similar measures."

The discussions which were inconclusive indicated that the question of the danger of healthy carriers is still open but suggested the desirability of directing special attention to the examination of *non-inoculated* persons.

The Cholera Commission recommended that the problem of cholera carriers should be further studied in India and that if possible an *ad hoc* Cholera Commission should be formed in that country.

(*b*) The Quarantine Commission dealt mainly with matters relating to the practical working of the I. S. C., 1926. Its report was divided under (*i*) double fumigation of loaded ships, (*ii*) standards for sulphur fumigation, and (*iii*) other matters. In regard to (*i*) the Commission recommended the addition of a fourth part to paragraph 6 of Article 25 of the Convention, *viz.*,

" When before or during the course of discharge of cargo, plague infected rats are found on board, or when it has been established that there exists on board an unusual mortality among rats, the cause of which has not been determined, the sanitary authority may require the fumigation of the ship before, or during the discharge of cargo ; and if during the course of discharge, or after the discharge of cargo, live rats are again found, a fresh fumigation may be carried out ; but only one of the fumigations thus effected should be done at the expense of the ship."

In order to make the matter clear the Commission in its report made the following commentaries :—

" (1) No change in respect of " suspected " or " healthy " ships is envisaged in the new text, which simply states the actual conditions under which a double fumigation may be applied to such vessels.

(2) Article 27 provides for a fumigation before discharge of cargo under certain conditions, but provides for no secondary or supplementary fumigation. The proposed addition to the text makes provision for such a second fumigation under certain specified conditions.

The fact that a ship is rat proof or carries a cargo likely to exclude the presence of rats (coal, oil, or petrol) need not as a right be taken to mean that the ship will necessarily be exempt from fumigation, but as a rule circumstances necessitating fumigation of such ships with a view to deratisation will in the ordinary course of events be few.

(3) When one fumigation only in full holds has been done, such a fumigation will usually not be held sufficient to warrant the granting of a certificate of deratisation under the terms of Article 28. In a few cases where the results can be demonstrated to be entirely satisfactory, a certificate of deratisation under Article 28 may be given. But such cases will be few.

(4) Where double fumigation is necessary it is clearly done in the interest of the port, only one fumigation should therefore be done at the expense of the ship."

In connection with (*ii*), the following documents were presented : (*a*) the report of the Quarantine Commission ; (*b*) Dr. P. G. Stock's note on standards of sulphur fumigation ; (*c*) Dr. Shahin Pasha's note on experiments of fumigation with Clayton gas ; (*d*) Dr. C. L. William's note on " The use of SO_2 for fumigation of ships " ; (*e*) Dr. C. L. William's note on " Experiments with liquid sulphur dioxide on board the S.S. " President Fillmore." The Commission decided to keep the matter of standards open and to await further information from other countries.

(*iii*) Other matters dealt with by the Commission included (*a*) Dr. Stock's note on " Signals indicating the sanitary condition of ships ", in which he pointed out certain discrepancies between the interpretation of certain signals in the 1931 code of signals and the actual meanings and terms of the 1926 Convention ; (*b*) a note entitled " The washing of soiled linen on passenger ships ", dealing with the possible dangers and nuisance arising from the practice of keeping dirty linen on board ship until the home port was reached. Except in regard to infectious disease, no rules have been framed on the subject in most countries ; (*c*) a note on new England and Welsh port sanitary regulations, 1933, presented by Dr. Stock and (*d*) a note on recent work in the U. K. and the application of Article 28 of the I. S. C., 1926.

(*c*) The Yellow Fever Commission's discussions mainly centred round the application and technique of the protection test and the investigation of endemicity of yellow fever in Africa.

(*d*) The Smallpox Commission devoted attention to problems connected with the preparation of vaccine lymph, the standards of bacteriological purity and the technique of vaccination. It was proposed to summarise the position from the data collected from different countries.

(*e*) Fairly satisfactory progress was recorded in regard to the facilities for treatment of merchant seamen suffering from venereal diseases under the Brussel's Agreement of 1924.

(*f*) Discussion of the International Convention for Aerial Navigation was confined to the reservations made by U. S. A. and Australia.

(*g*) A draft agreement concerning the abolition of Bills of Health or Consular visas of Bills of Health was prepared for circulation to the countries signatory to the I. S. C., 1926.

(*h*) The discussions on plague centred round points of epidemiology and clinical aspects of the disease. The contributions made on the subject included Lt.-Col. Taylor's Memoir " Haffkine's Plague Vaccine ", which described the development of its preparation from its original inception by Haffkine in 1896 up to the present day. Following the discussions in the spring session of 1932 a note on " Cerebro-spinal Meningitis in British India " by Lt.-Col. A. J. H. Russell, I.M.S., was presented by the delegate for India.

(B) At the October Session of the " Office ", India was represented by Lt.-Col. S. P. James, I.M.S., (Retd.), as Major-General Graham was again unable to attend. Nine members for the Health Committee of the League of Nations were selected, *viz.*, Drs. Reiter, Lasnet, Morgan, Lutrario, Tsurumi, Carriere, Jitta and Ricardo Jorge and Surgeon-General Cumming.

The more important items dealt with at the session included (*i*) facilities for the fumigation of ships at the port of Calcutta ; (*ii*) model deratisation certificates ; (*iii*) sulphur fumigation ; (*iv*) fumigation signals ; (*v*) plague ; (*vi*) cholera ; (*vii*) yellow fever ; (*viii*) smallpox vaccination.

(*a*) The report of the Quarantine Commission referred briefly to the development of the International system of messages which may be sent by ships to the port of arrival in order to facilitate quarantine measures ; the conclusion of agreements for the suppression of Bills of Health or Consular visas thereon ; and the dengue convention. In regard to the incorporation of more detailed and uniform notes on rat harbourage in the International model certificate of deratisation or exemption, the Commission was of opinion that, although the sanitary authorities of particular ports might find it advantageous to add the special notes suggested, it would not be advisable to recommend their general adoption.

The Peruvian Director of Public Health communicated the circumstances which, in the opinion of the authorities of that country, seemed to have led to the importation of plague, both recently and on former occasions. These circumstances related to the arrival in Peruvian ports of ships, especially from Calcutta, with cargoes of bales of jute bags which are said to have contained live infected fleas. The Peruvian sanitary authority considered it necessary to apply immediate fumigation to all ships carrying such cargoes ; it suggested, however, that, in order to avoid these measures on arrival, the disinsectisation of the cargo should be carried out on the departure of the ship.

The Commission, having examined references on the subject of the transmission of plague by fleas, expressed some doubt whether transmission in this way was possible in the circumstances described, having special regard to the length of survival of infected fleas. As, however, a similar question had previously been raised (in Nigeria, for example), and that special measures with regard to jute would be detrimental to an important trade, the Commission proposed to re-examine the question later, after further detailed information had been presented by the delegate for India.

As regards the methods of sulphur fumigation of ships, it was considered advisable to establish standards for minimum or optimum conditions which should be fulfilled in order that the process should be fully effective.

(*b*) The Aerial Navigation Quarantine Commission was formed as a result of the signature at the Hague on 12th April, 1933, of the International Aerial Sanitary Convention. The function of this Commission is regularly to take stock of the administrative and technical position of these matters and to keep the Permanent Committee informed in regard to them. With a view to secure uniformity, the delegate for India drew attention to certain difficulties arising from the application of different national rules regarding the acceptance on the arrival of aircraft, of certificates of vaccination against cholera and smallpox, in cases where such certificates are required.

Although Article 32 of the Convention specifies that persons vaccinated against cholera within less than six months but more than six days (due evidence of the vaccination having been produced) can only be submitted to " surveillance ", the countries on the air route from India to Europe prescribed different periods which not only differed from the Convention but also from one another. Another point was that vaccination by 2 inoculations was required.

As regards the periods, the Office International d'Hygiene Publique has received assurances from the Governments of Palestine, Transjordan and Iraq that the regulations of their countries will be framed in accordance with the requirements of Article 32. A similar assurance was given by the delegate for Egypt. In regard to Persia, the delegate of that country promised to represent the proposal favourably to his Government. The Commission regarded these first results with satisfaction, and laid stress on the importance of all countries traversed by international air lines giving the quickest possible recognition to the periods laid down in the Convention.

As Article 32 of the Convention did not specify the number of inoculations, the principle involved was considered. Although two inoculations confer a higher degree of immunity than a single inoculation, the question before the Commission was not that of obtaining the most complete protection possible for an individual who is exposed to infection in a centre of epidemic or endemic cholera, but whether the protection given by a single inoculation is sufficient to assure that the vaccinated person, even if he may have been exposed to infection at the time of his leaving an infected area, is unlikely from the fact of this vaccination to be attacked by cholera in the healthy area in which he arrives. In the opinion of the Commission the latter interpretation adequately meets the practical requirements of quarantine. The available data showed that single inoculation was ordinarily adopted in countries where repeated vaccinations of the population were difficult and, on the other hand, that this practice had in no way prevented positive results being obtained. In their opinion there was no reason why a certificate of a single inoculation should not be entitled to the advantages of Article 32 of the Convention, but stress was laid on the point that a single inoculation can only be useful if performed with an adequate dose appropriate to a single inoculation, thus giving a guarantee of practical value. The question of dosage was referred to the Cholera Commission and, still treating the question from a practical point of view, the Commission considered that it should be recognised that in countries where a single inoculation was the rule, where the dosage of bacilli and generally speaking the technique followed for this inoculation were such as were found sufficient for the purpose, certificates given in those countries should be considered to supply the guarantee desired. On the other hand, the Commission wished it to be understood that, in the case of certificates given in countries where two inoculations were the rule, a vaccination which only represents the first of these inoculations, with the number of bacilli ordinarily employed for this first operation, could not be considered as valid.

Article 35 relating to smallpox, specifies that persons who have been vaccinated within less than three years and more than twelve days (always subject to the production of due evidence) should be considered as being protected. These periods were fixed after careful deliberation and moreover had been accepted for many other purposes not only by the Commissions on Smallpox and Quarantine, but also by the Permanent Committee itself. It is thus in a position to recommend to Governments which have not already done so to adopt in their regulations or in their practice the periods which have been specified in the Convention.

In regard to the practice still followed in one country which requires passengers to be inoculated against plague, the Commission drew attention to the fact that neither the new Convention nor the Sanitary Convention of 1926 took account of anti-plague vaccination. The position taken up by the Office International d'Hygiene Publique as the result of its special inquiry on the subject was that although a community vaccinated against plague was less susceptible as a whole to subsequent attack by the disease, it was still impossible to declare that a given individual who had been vaccinated was himself effectively protected against the disease. Anti-plague vaccination could not therefore be included in the category of quarantine measures. From that point of view, in the present state of knowledge, any protection which it afforded could only be considered illusory and its attendant inconveniences unprofitable.

(c) The Yellow Fever Commission reported the progress made with the protection test survey in Africa and considered it desirable to make further detailed investigations in regions in which the tests had given positive results but where no clinical cases of yellow fever had been observed.

(*d*) The subjects discussed by the Cholera Commission included standard agglutinating sera for the identification of cholera vibrios. The results of tests made with the sera prepared by Dr. Madsen and by Dr. Cantacuzene had been received from various countries including those from Lt.-Col. Taylor, Director, Central Research Institute, Kasauli, and Captain Pasricha of the Calcutta School of Tropical Medicine. The rôle of carriers in the propagation of cholera and the views of the Government of India as regards the possible formation of a Cholera Commission in India in collaboration with the I. R. F. A. were communicated by the delegate for India. As regards cholera inoculation by a single injection, the problem to be studied was the vibrio content of a single dose of vaccine which was necessary to confer adequate immunisation. With this end in view it was proposed to obtain information, from those countries where cholera inoculation by a single injection is justified by the local circumstances, regarding the approximate number of vibrios in a dose, the local and general reactions if any and the experimental facts which determine the number of vibrios considered as indispensable for the injection.

(*e*) The Smallpox and Vaccination Commission reported on recorded cases of post-vaccinal encephalitis in England, Holland, Sweden and Germany ; the culture of vaccine on the chorio-allantoic membrane of the chick embryo ; and the results of the enquiry into the best methods of vaccination.

Eastern Bureau, League of Nations.

57. The Bureau was directed by Dr. C. L. Park.

The 14th Assembly of the League at Geneva, in adopting a resolution expressing its appreciation of the value of the results obtained by the Health Organisation included a paragraph expressing its gratification " at the increasing importance of the part played by the Eastern Bureau in the prevention of pestilential diseases."

The Health Committee, during its 20th session held at Geneva in October, while considering the report of the Bureau for 1932 and the resolutions adopted by the Advisory Council and its budget estimates for 1934 adopted the following resolution :—

" The Health Committee :

" Approves the resolutions adopted by the Advisory Council of the Eastern Bureau during its seventh session, and the budgetary provisions for 1934.

" Notes with pleasure that the Advisory Council approved in principle the convening, as soon as circumstances permit, of a Conference on Rural Hygiene in the Far East ;

" Recognises that the creation of international malaria courses at Singapore, with the support of local authorities, offers a useful manifestation of international co-operation ;

" Expresses its gratitude to those Governments which, since the creation of the Eastern Bureau, have by their special financial support given proof of their interest in it. "

Dr. Hermant, I. G. of Medical and Health Services, Indo-China, acted as Chairman and Dr. Wu Lien-teh, of the Chinese Quarantine services, as Vice-Chairman of the Bureau. Major-General Graham, who represented India on the Advisory Council of the Bureau, was unable to attend the meeting of the Council held at Singapore from 29th March to 1st April, 1933.

"The Council approved the following resolutions :—

1. The Advisory Council approves the report of the Director of the Eastern Bureau for 1932 and records its appreciation of the work done by the Bureau during the year and of the form in which the report has been presented.

2. The Advisory Council passes the accounts for the year 1932 which have been duly certified by the Auditors of the Bureau.

3. The Advisory Council having considered the proposed Estimates for the year 1934, amounting to $105,266, approves this estimate of expenditure.

4. The Advisory Council accepts with regret the resignation of Dr. Uchino as Chairman and places on record its great appreciation of his services to the Bureau and to the Advisory Council during his term of office as Chairman.

5. The Advisory Council has considered the request of the Medical Director that the despatch of epidemiological information be expedited by 24 hours but regrets that administrative difficulties seem at present to render this course impracticable.

6. The Advisory Council requests the Director of the Eastern Bureau to investigate the possibility of replacing the returns now exchanged periodically between various administrations by similar information in the Weekly Fasciculus, providing an adequate review of the distribution, incidence and virulence of epidemic diseases in the various territories within the regional zone.

7. The Advisory Council requests the Director of the Bureau to consider the progress of the proposed International Malaria Courses at Singapore in connection with the authorities concerned or interested so that the experience gained from this first course might be used in considering for the future the furthering of the campaign against malaria in every country and international co-operation in this campaign.

8. The Advisory Council approves the principle of holding a Rural Hygiene Conference in the Far East, as proposed at the 13th Assembly of the League, and the representatives of the Health Administrations present undertake to supply information on the lines of the questionnaire prepared by the Director."

The question of transfer of plague by maritime traffic was discussed and it was suggested by Dr. Cumpston that it would be profitable for the Bureau to make a study of the conditions under which a ship became infected. The proposal to establish an air route through Singapore to Australia *via* Timor, Port Darwin and the northern coast of Australia was also discussed but, as the members who participated were not in a position to express the views of their governments on the question of requiring vaccination of passengers from infected countries, they undertook to communicate to the Bureau at a later date the attitude of their respective countries in the matter. In regard to the possibility of the introduction of yellow fever into Asia, the following statement represented the considered opinion of the Council :—

"The occurrence of yellow fever in Asia is dependent under present conditions upon its introduction from either America or Africa. Although yellow fever may be regarded as endemic over a wide area of West Africa, there is at present no evidence that the disease exists in any part of the Eastern half of Africa. There are definite physical obstacles against its transfer to the Eastern sector but the development of air routes and the activity which is taking place in the opening up of new roads may serve to penetrate these natural barriers. Both forms of communication constitute a potential risk, the greater danger being probably from slow spread from village to village. Measures against spread by air routes have already been formulated. Surveys and re-surveys of the population along the new roads will show if the disease is spreading along them."

"With the opening of the Panama Canal it was feared that yellow fever would be spread from America to Asia. Notwithstanding a very large amount of maritime traffic no such spread has occurred. This is due for the most part to the measures which have been taken in the infected localities. The danger of spread from Africa is so much in the minds of the health authorities in that country that it is reasonable to assume that as effective precautions will be taken as those in the infected areas in America. The Council considers that, while the position should be continuously and carefully watched, there is no immediate prospect of yellow fever entering Asia or Australia, and it considers further that each development in the direction of increasing risk will be met by adequate precautions introduced by each infected country in the terms of the International Sanitary Convention for Aerial Navigation."

The epidemiological intelligence service continued to be the main function of the Singapore Bureau. During 1933, Vladivostok and some inland provinces of China and some Indian States were the only areas which either did not telegraph such information or supplied incomplete data. Arrangements were made with the administrations of French and Portuguese India for more expeditious transmission of epidemiological news. The question of direct telegraphic transmission of information from Vladivostok was being examined. In regard to wireless bulletins, the outstanding features were the alteration in the method of transmission from Saigon from long wave to short wave and the transmission of the Malabar message both on long and short waves. The Union of South Africa and the countries along the East African coast being unable to pick up the short wave messages, the Tananarivo station in Madagascar undertook to re-broadcast the messages on long waves. The transmission of the weekly broadcast in clear from Saigon was continued. Only one instance of failure to pick up the Saigon message was reported from British India but mistakes in the messages broadcasted from Saigon were frequent and steps were taken to minimise their recurrence. Weekly cables were continued to Vladivostok, Canton, Bushire, Basrah, Aden and Victoria (Seychelles). As ten-letter words could no longer be used after the end of 1933, five-letter messages were introduced. This year the form of the weekly Fasciculus was improved so as to include particulars of minor infectious diseases in respect of various countries.

Infected ships.—The previous arrangement with the P. H. C. with the Government of India, by which either the next port of call or the Eastern Bureau would be notified in the case of infected ships arriving at ports in British India having been applied only to vessels proceeding to the East, it was arranged that in future information should also be sent by cable to the Eastern and the Alexandria Bureaux of the arrival at the ports of British India of infected vessels proceeding westward. The trouble arose from two infected vessels which sailed from British India for Marseilles.

Ships infected with smallpox numbered 37 and in 16 of these the source of infection was traced to ports in British India. Only 4 ships were infected with cholera and in each case the notification came from a port in British India. None of the Eastern ports reported the arrival of plague infected ships.

A fatal case of typhus occurred on a vessel which arrived at Bombay towards the end of May, the passenger having been infected before embarkation at Shanghai. Chickenpox was reported on 43 vessels, influenza on 2, measles on 12, scarlet fever on 5 and mumps on 3.

Pilgrim traffic.—The total number of ships carrying pilgrims was 29 and these included 8 from Bombay, 8 from Karachi, 1 from Calcutta, 4 from the Dutch East Indies, 3 from the Straits Settlements and 5 from Egypt. All pilgrims embarking from ports of British India for Jeddah are medically examined before departure and vaccinated against smallpox,—unless satisfactory evidence as to immunity is produced,—and inoculated against cholera. The same procedure applies in the case of Straits Settlements and the Dutch East Indies but, in the case of the latter country, inoculations against typhoid and dysentery are also carried out. The pilgrimage was declared clean by the Egyptian Sanitary, Maritime and Quarantine Board and only 5 mild cases of chickenpox were notified on a vessel returning to British India.

Quarantine notifications.—A large number of administrations notified the application of quarantine measures against ports infected with plague, cholera and smallpox.

(*a*) The Dutch East Indies applied measures in the case of vessels from Bombay, Rangoon and Colombo, where plague was present in endemic form. The measures require that any ship that in the preceding 3 months has called at any plague infected port can only obtain pratique at first and second class " qualified " ports in the Dutch East Indies. At these latter ports fumigation with sulphur dioxide by Clayton or Hally apparatus is carried out before the cargo is unloaded, unless the vessel after loading has been deratised before or after leaving the plague infected port or unless the master of the vessel can produce the following certificates :—

(*i*) that the vessel was deratised or exempted in a " qualified " foreign or Dutch East Indies port within six months according to the Paris Convention, 1926 ;

(*ii*) that in the plague-infected port the vessel has, if possible, not been moored at the quay and has taken the usual preventive measures against rat infestation from the shore ; and

(*iii*) that the vessel in the plague infected port did not take any considerable amount of rat-attracting cargo which was not deratised immediately before loading such cargo in the ship.

In a qualified Dutch East Indies port, ships arriving from a plague infected port under these conditions as a rule obtain free pratique and no fumigation is required. In dubious cases general conditions on board the ship, *e.g.*, signs of rat infestation, rat-proofing, cleanliness, etc., are taken into consideration in deciding whether fumigation is necessary or not.

All ships coming from Bombay, Rangoon or other plague infected ports are fumigated at their first port of call in Japan before the cargo is unloaded. The fumigant used is carbon monoxide-dioxide mixture generated by the incomplete combustion of coke. An exception is made in the case of vessels from Dutch East Indies provided they carry an official certificate showing that deratisation has been performed after loading and just prior to departure.

(*b*) The effect of the notification of a port as cholera-infected by Dutch East Indies is that vessels arriving therefrom within 21 days are subject to medical inspection and all passengers are required to produce certificates of inoculation against the disease, performed either at the infected port of departure or during the voyage. Those who cannot do so are inoculated forthwith. If no cases are found, crew and passengers are kept under surveillance for 5 days from date of departure from the infected port, but during this period the ship may proceed under surveillance to other ports. The excreta of crew and passengers under surveillance must not be emptied into the waters of the port without previous disinfection.

In the Straits Settlements, quarantine examination of vessels from infected ports is carried out to determine if cases are present. If not, all deck passengers arriving within 5 days of leaving the infected port are sent to the Quarantine Station at the port of disembarkation and detained for the balance of the incubation period. Cabin passengers are released under surveillance.

Vessels arriving in Hong Kong from ports declared infected with cholera undergo quarantine inspection. If no case is present, but 5 days have not elapsed since leaving the infected port, through deck-passengers are not allowed to land and hawkers are not permitted on board. If more than 5 days have elapsed, no special action is taken.

Vessels arriving at Saigon from ports declared infected with cholera are inspected and, if no cases are found, all deck passengers are inoculated against

the disease unless this procedure was carried out either at the port of departure or during the voyage. If the voyage is of shorter duration than 5 days, these passengers are kept under surveillance until the 5 days' period has passed.

The crew and passengers of vessels arriving at Japanese ports from ports declared infected with cholera have their stools examined for the presence of cholera vibrios at the first port of call in Japan. They are allowed to continue the journey under surveillance and the result is telegraphed to the next port of call for further necessary action.

As regards the Philippine Islands :—(*i*) passengers from cholera infected ports within a few days' steam of Manila must be inoculated before departure ; (*ii*) the crew and passengers of vessels arriving in Manila after a journey of more than 5 days from a cholera infected port have their stools examined on arrival. Cabin passengers with a definite address are allowed to land immediately, but steerage passengers are detained on board for 12/24 hours until the results of the examination are known.

(*c*) Owing to the prevalence of smallpox many ports were notified as infected. The measures imposed against arrivals from such ports varied. Iraq required all deck passengers from India to produce certificates of vaccination against smallpox performed during the preceding 3 years or to show marks of recent successful vaccination.

The Philippine Islands, on the other hand, require disembarking passengers arriving from infected ports to produce acceptable evidence of vaccination against smallpox within a year, or of vaccination before embarkation.

The procedure in the Straits Settlements depends on the action taken in the ports of embarkation. For example, deck passengers from British India and China are vaccinated before departure and are landed at the Quarantine Station on arrival at ports in the Straits Settlements for disinfection and revaccination of those who have not shown successful results. Deck passengers from other smallpox infected ports are landed at the Quarantine Station, vaccinated and detained for 4 days. Those whose vaccination has not taken are revaccinated, but are released on the 5th day.

In French Indo-China, deck passengers are medically examined and revaccinated if evidence of successful vaccination before departure from the infected port is not forthcoming.

Disease incidence in ports.—Plague infection is confined to a few ports which are endemically infected and which show seasonal exacerbation in certain cases. The danger of transfer of infection from these ports varies. They include Bombay with a large export trade in raw cotton, Rangoon, Bassein and Bangkok (rice), Saigon and Pnom-penh.

Among the Eastern Bureau ports, Calcutta was, as usual, infected with cholera throughout the year ; Chittagong also reported a much heavier incidence of cholera ; Bombay, Moulmein, Rangoon and Vizagapatam reported sporadic cases only.

Between Alexandria in the Near East and Hong Kong in the Far East, many ports recorded a greatly increased prevalence of smallpox. These included Alexandria, Karachi, Bombay, Calcutta, Madras, Colombo, Canton and Hong Kong. Chittagong, Moulmein and Tuticorin were almost completely free ; Singapore and Batavia recorded only one case each.

Research programme.—Plague.—Dr. Hirst's contributions to the study of plague epidemiology have been further added to by the publication of the

results of " A Rat-flea survey of Ceylon," which contains also " A brief discussion of recent work on rat-flea species distribution in relation to the spread of bubonic plague in the East Indies ". The rat-flea survey at Shanghai was continued.

Cholera and bacteriophage.—Dr. Asheshov's work has been mentioned as well as Burnet's and others work on the biological nature of bacteriophages. Investigations in Shanghai showed that practically all samples of " non-water works " water examined contained non-agglutinating water vibrios. Linton's work at Calcutta tends to establish a closer relationship between water vibrios and true cholera vibrios. A reference to Pasricha, deMonte and Gupta's work at Calcutta is also made.

Liaison work.—This was carried out by the distribution of documents and by personal contact.

Malaria course.—A programme for both laboratory and theoretical study was drawn up for the first course to commence from 30th April, 1934. Through the courtesy of the Health Administrations of Indo-China, the Netherlands East Indies and Straits Settlements, field courses extending over a period of 21 to 25 days were being arranged in each of these countries. These will include an intensive course to enable candidates to take part in the practical application of the methods of control used in these areas. It was proposed to divide the candidates into 3 groups, each of which would carry out a course of field study in a country where the problems are similar to those which the candidates will be required to deal with in their own countries. The Health Organisation has offered 6 fellowships to Eastern countries on the condition that the acceptance of a fellowship involves the obligation to send an additional candidate at the expense of the country concerned.

Study tours.—These were arranged for Dr. Vidhivejj of Siam and Dr. Anklesaria of Rangoon. The former made a short intensive study of the quarantine methods in New York, New Orleans, Baltimore and San Francisco ; the latter studied the quarantine procedure at Penang, Singapore, Hong Kong, Shanghai, the Japanese ports and Manila.

Rural Hygiene.—Information was being collected to form a basis for the conference on rural hygiene which it is proposed to hold at some future date.

Health Section of the League, Geneva.

58. The programme of the Health Organisation covers work of both a permanent and temporary character. The permanent activities arise very largely out of Conventional obligations and the undertaking of certain essential tasks, such as that of the Epidemiological Service and the technical Commissions. Notwithstanding reduced financial resources, the Health Organisation is to be congratulated on being able to carry on and even to strengthen these essential services. As regards temporary or occasional activities, these have had to be restricted to a certain extent. The work of the Health Organisation can be studied from its Annual Report for the period from October, 1932 to September, 1933 (A. 13·1933, III) and other publications issued from time to time. The decision of the League to discontinue the printing of the minutes of the Health Committee sessions is regrettable as these were valuable as a guide to the circumstances in which particular resolutions were adopted and as a record of the views or reservations made by the individual members. During the absence of Dr. Rajchman who was on deputation in China as the League's technical agent for one year, Dr. Boudreau acted as Director of the Health Organisation at Geneva.

The budget estimates sanctioned for 1933 included 980,000 gold francs from the League's general budget and the annual contribution of 750,000 gold francs from the Rockefeller Foundation.

According to the statutes of the Health Organisation, the Health Committee is constituted as follows :—

(1) The President of the Permanent Committee of the Office International d'Hygiene Publique and 9 members appointed individually by that Committee in such a way that each state which is a permanent member of the Council is represented on the Health Committee.

(2) Six members chosen by the Council after consultation with the Health Committee ; 4 experts as assessors appointed by the Council on the nomination of the Committee ; and such experts as the Committee may decide to co-opt in virtue of Article 9 of the rules of procedure of the Committee. During 1933, the Committee consisted of 26 members. The rules of procedure provide for two meetings each year, which have been held ordinarily in April and October. Since 1931, however, for reasons of economy the Committee has held only one annual session in October.

A *per interim* advisory bureau is attached to the Health Section, its members including Dr. Madsen (President of the Committee), Sir George Buchanan (*ex-officio*) and three temporary members, *viz.*, Prof. Fitzgerald, Dr. Stampar and Prof. Pittaluga. The temporary membership of the Bureau as approved for 1934 were Surgeon-General Cumming (U. S. A.), Dr. Lutrario (Italy), Dr. Jitta (Holland), and Dr. Husamettin (Turkey). This Bureau is from time to time called upon for advice, but business is chiefly conducted by correspondence.

The term of the office of the Health Committee due to expire on June 30th, 1933, was prolonged by the Council of the League to December 31st, 1933. The reason for this extension was that the present Committee had drawn up in 1930 a programme of work extending over a period of 3 years and it was considered desirable to give it an opportunity of judging of the work done and of making a report to the Council on the subject.

League health commissions and sub-commissions were at work during 1933 on malaria, biological standardisation, opium, tuberculosis, syphilis and cancer. The work of the Permanent Commission on biological standardisation which was being continued with the co-operation of the institutes in Copenhagen, Frankfort, London, Paris and Washington and others that have agreed to act as centres for the international comparison and control of vaccines, serums, vitamins etc., has reached a stage which opens up a prospect of agreement on the choice of a standard for anti-gangrene serum and of the solution of various problems such as those relating to the standards for anti-tetanus and anti-dysenteric sera. It was proposed to augment the scope and importance of the Biological Standards Commission by affording certain countries a wider representation on the Commission. As regards the Malaria Commission, a meeting of selected members was held in October, 1933, when a series of resolutions were prepared and later discussed and adopted at the October meeting of the Health Committee. These were concerned chiefly with proposals for the continuation of investigations relating to (*a*) the new synthetic anti-malarial preparations, atebrin and plasmoquine and the mixture of quinine alkaloids named totaquina ; (*b*) the biological properties of different species and geographical strains of the malaria parasite, particularly their comparative susceptibility to the action of anti-malarial remedies ; (*c*) arrangements for collaborative studies by different European laboratories on the subject of malarial immunity ; (*d*) the habits of the several varieties of

the malaria carrying mosquito *Anopheles maculipennis* which occur in Europe and the morphological characters by which each variety can be identified; and (*e*) arrangements for future courses of instruction in malaria.

The Commission of experts which was formed to carry out an investigation of the various methods of determining the morphine content of different kinds of opium and of establishing a standard method which would serve to remove the discrepancies resulting from titration by a number of different methods in various countries reported to the October, 1933, Committee, that it had succeeded in establishing a method which fulfils the practical requirements necessary for administrative control.

The epidemiological, statistical and general sections continued to publish reports, lists of which are given in the progress report under consideration. The publications appear under (*a*) epidemiological intelligence and statistics, (*b*) International Health Year Book, (*c*) quarterly bulletin of the Health Organisation, (*d*) special studies and investigations and (*e*) annual reports and minutes of the Health Committee Sessions. The quarterly bulletin and the special reports include many valuable contributions which are well worth study.

Technical co-operation with the National Government of the Chinese Republic was continued. The programme is based on a system of health centres built up in various parts of China, the establishment of a national quarantine service, which is gradually taking over the quarantine service in the various ports, and the organisation of a campaign against the chief infectious diseases which has so far occupied itself in carrying out large scale vaccination against cholera and smallpox chiefly in the basin of the Yang-tse-Kiang river.

The epidemiological intelligence service both at Geneva and Singapore continued to function usefully.

The 20th sesssion of the Health Committee was held at Geneva from October 27th to November 1st when the results of the work accomplished during its 3-year period of office were examined and a report was submitted to the League Council. Major-General Graham was unable to attend. The Medical Director's report, reviewing the progress achieved in the various branches of the Health Organisation between October, 1932, and September, 1933, was presented. Briefly it dealt with the following main headings which were discussed seriatim and approved: (1) technical co-operation with certain governments; (2) work of the technical commissions; (3) economic depression and public health; (4) liaison with the health administrations; (5) rural hygiene; and (6) epidemiological service and health statistics.

Malaria Commission.—This section of the work has made notable progress since the report on synthetic remedies, etc., was taken up and since the co-ordination of malaria work by the Geneva staff has been entrusted to Dr. Ciuca. The Commission dealt with the enquiry into the quinine requirements of malarial countries which it had been carrying on since 1925; the therapeutics of malaria; a study of the incidence of malaria in the deltas of the Danube, the Ebro, the Po and the Rhine; housing and malaria; the international courses in malariology at Paris, Rome and Singapore and the field work in the anti-malarial stations of Spain, Italy and Yugo-Slavia; totaquina; and the award of the Darling Prize. By far the most important conference of the year was that of members of the Malaria Commission, which was held at Geneva from April 25th to 27th to consider the report on "The therapeutics of malaria", which has been published in the League's Quarterly Bulletin

for June 1933 (Vol. II, No. 2). The report gives a comprehensive survey of the present position of knowledge on biological aspects of the disease and on the discovery and manufacture of effective synthetic anti-malarial remedies.

Opium Commission.—The report on this Commission dealt with Article 8 of the International Opium Convention, 1925; standardisation of methods of dosage of morphine contained in the various kinds of raw opium; modern methods of treatment of drug addicts; technical interpretation of Article 13, paragraph 2 (*b*) of the Convention for the limitation of the manufacture of narcotic drugs which came into force on 9th July, 1933.

Economic depression and public health.—Early in 1933, a conference of experts nominated jointly by the Health Organisation and the International Labour Office and presided over by Monsieur Cahen Salvador, Conseiller d'Etat, France, held several meetings in Geneva and Paris and eventually prepared a report and formulated recommendations which were published in the June, 1933, issue of the League's Quarterly Bulletin. The report of a Conference of experts which met in Berlin in December, 1932, published in the League's Quarterly Bulletin for March, 1933, should also be studied for details.

The Health Committee, after considering the report, decided to forward it for information to the different health administrations. The Health Committee also decided that the Health Section and the International Labour Office should continue to collect data in regard to (*i*) organisation of medical care; (*ii*) economy in prescription and treatment; (*iii*) secret remedies and charlatanism; and (*iv*) hospital, public health and preventive medical services.

Medical Education.—Dr. Burnet's report on medical education and the reform of medical studies, based on his visits to the U. K., France, Germany, Italy, the U. S. S. R. and the U. S. A., was presented to the Health Committee at the October, 1933, Session, who noted it as an objective study of the tendencies at present characteristic of the progress of medical education in certain countries and recommended that it should be forwarded to the various national organised bodies which were dealing with the reform of medical education. The report was published in the December, 1933, issue of the League's Quarterly Bulletin.

International centre for the study of leprosy.—The Council of the League of Nations in September, 1931, accepted the Brazilian Government's offer to establish at Rio de Janeiro an International centre for research on leprosy to be placed under the auspices of the League of Nations. The administrative provisions under which the centre is established are similar to those relating to other international institutes placed at the disposal of the League by particular Governments. The centre consists of (1) a governing body consisting of the members of the Health Committee of the League acting in their personal capacity and of the Chairman of the Committee of Management, appointed by the Brazilian Government; (2) a Committee of Management consisting of 7 representatives; and (3) a Director. The governing body at their first meeting on 1st November, 1933, appointed Professor Chagas as Director and during the winter of 1933-34 the Committee of Management made the necessary arrangements with a view to inaugurate the work of the centre.

The Indian Delegation* to the 14th (Ordinary) Session of the Assembly of League of Nations.

59. The Indian Delegation consisted of (1) Sir Brojendra Lal Mitter, K.C.S.I. (Member of the Executive Council of the Governor General of India), leader of the Delegation, (2) Sir Denys Bray, K.C.S.I., K.C.I.E., C.B.E. (Member

* Report published in the *Gazette of India* for week ending 13th January, 1934, under Notification No. 73/33-C. & G., dated the 4th January, 1934.

of the Council of India) and (3) Sahebzada Abdus Samad Khan (Chief Minister, Rampur State). Sir Hormusji Mehta, a member of the Council of State, acted as substitute delegate.

The Delegation reported on the second Committee (technical organisations) as follows :—

" Full recognition was given, we were glad to note, to the work of the Eastern Bureau; that sentinel placed at Singapore by the Health Organisation to announce the appearance and follow the evolution of the epidemics of pestilential diseases of which Asia is the cradle. Appreciation was expressed of the help given by India and other Far Eastern Governments in broadcasting the Bureau's messages, in code and in clear, free of charge from their wireless stations.

Much satisfaction was expressed at the success of the Regional Health Conference held in Cape Town in November, 1932. From the point of view of India, the most important matters considered at the Conference were the technical discussions on the prevention of the transmission of yellow fever by aeroplane, arising out of the provisions of the Yellow Fever Chapter of the International Sanitary Convention for the control of Aerial Navigation, and the question of the adoption of uniform regulations for the prevention of the introduction into African countries of smallpox from India. There was general agreement that, in view of the advantages derived from this exchange of views between the Governments of neighbouring territories, similar Conferences might with great advantage be convened by the Health Organisation.

Several speakers referred to the services rendered by the Organisation to the Chinese National Government, whose delegates expressed deep appreciation of the technical collaboration of the Organisation in the work of reconstruction on which China was engaged. The fact that it was the Director of the Health Section who had been chosen as Liaison Officer between the League and the Chinese Government was sufficient proof that Public Health was the sphere in which this collaboration was expected to yield the greatest results. As evidence of the direct and tangible benefits conferred on a great Eastern nation by membership of the League and of the growing concern of the League with the problems and difficulties of extra-European countries, these activities of the Organisation are of interest to India.

As is made clear in the Report to the Assembly reproduced in the Appendix, the Organisation, during the year, has pursued with unabated vigour the task, imposed upon it by Article 23 of the Covenant, of preventing and controlling disease where these are matters of international concern. In many of these activities India has the closest concern. In respect of such bodies, to name only the more important, as the Commissions for Malaria, Ship Fumigation, Leprosy, Tuberculosis and Plague, India has not only made important contributions to the common stock of knowledge, which it is their function to co-ordinate, but derives herself most material advantages.

Despite the undoubted value of the Organisation's work, the point was made by several delegates that its activities should be carefully selected and limited to matters of international concern, so that it might not outrun its mandate under the Covenant. This was the more necessary, in view of the general financial position of the League and of the diminution in value, owing to depreciation in the exchange, of the contribution which the Rockefeller Foundation makes to it in dollars. As examples of activities which might be curtailed without detriment to the League's essential functions were mentioned the investigations into the effect of the economic crisis on public health, and the assistance given to Public Health Administrations of different countries in regard to matters which had little or no international significance. "

The following observations are taken from the remarks made by the President in his opening address :—

" Of all the tasks which the Covenant has imposed upon the League of Nations, there is perhaps none which brings out so clearly the universal character of this institution and the solidarity of men of every race in the face of danger as the work accomplished by the Health Organisation.

Indeed, in the presence of disease, solidarity is no longer simply a virtue, but an imperative and pressing necessity. The time has passed when the fortunate inhabitant of Western countries could disregard the fate of his brothers on other continents. With the development and improvement of means of communications a ship infected in the China seas may be a danger to the Mediterranean ports and to those of the Gulf of Mexico, for distance is no longer a barrier against epidemics.

And it is no doubt because this idea of solidarity is constantly gaining ground in the minds of those whose task is to protect their countries against disease that we see today the Governments of the States Members of the League turning more and more fre-

quently to the Health Organisation for assistance in the solution of problems which, transcending the national sphere, can only be solved on the international plane.

During the past year, the four principal continents were represented among the countries which thus called upon the Health Organisation for assistance.

This solidarity in face of danger is also the aim of the Eastern Bureau, that sentry placed at Singapore by the Health Organisation to announce the appearance and watch the development of the epidemics of pestilential diseases of which Asia is the cradle. The system for collecting information at the disposal of the Eastern Bureau is now complete and extends from the Cape to Vladivostok and from Melbourne to Panama. It may therefore be confidently stated that no focus of plague, cholera or smallpox can occur in any of the 163 ports in touch with the Singapore Bureau without the latter being immediately informed by telegraph. Its task is then to announce the existence of this focus to the health administrations of the countries which run the risk of being infected either by land or by maritime traffic.

This is where wireless proves useful, and I cannot omit to mention the generous help given in this connection by the Governments of Indo-China, the Netherlands East Indies, Hong Kong, North Borneo, Shanghai, Japan, British India and Madagascar by broadcasting free of charge from their wireless stations, the Eastern Bureau's messages, both in special code and in clear. The broadcast in clear is intended to inform ships at sea of the health situation of the ports at which they call; it is transmitted daily at a fixed hour by the powerful Malabar station at Java, and can be picked up on all the maritime routes of the Indian and Pacific Oceans. It is gratifying to find that ships of every flag utilise and appreciate this information service to an ever growing extent.

The Health administrations of the Eastern countries being rapidly and regularly informed by the Singapore Bureau of the risks to which their ports will be exposed, have thus been able to take quarantine measures with a full knowledge of the facts and reduce them to what was strictly necessary, which has of course been of great benefit to shipping.

Last year, the Second Committee took note of a preliminary study prepared by the Health Section on *the possible influence of the privations entailed by unemployment on morbidity and mortality*. This report went to the root of this problem, to which the Health Organisation has devoted special attention since the last Assembly. The Health Committee outlined the principles which should guide its work in this field, and the studies in which the greatest progress has since been made are those dealing with the methods of detecting malnutrition and the best means of safe-guarding public health in times of depression. On the first point, a Conference of Experts, held in Berlin in December, 1932, drew up a plan of action which is already being carried out in Austria, Belgium, Hungary, the Netherlands, Poland, the United States and Yugoslavia. At the Council's invitation, the Health Organisation and the International Labour Office co-operated in studying the second point, and a Conference of unofficial experts in Health Administration and Social Insurance drew up the main lines of a scheme for the rationalisation of public health services and medical assistance, with a view to obviating the risks to the sanitary equipment of countries caused by the inevitable reductions in health budgets.

The Health Organisation has two means of enabling medical officers in the health services of the different countries to benefit by international experience; collective study tours and individual fellowships. In 1933, a collective tour was arranged in Poland from May 28th to June 29th. Fifteen medical officers took part; at the same time, twenty-eight fellowships for periods up to six months were awarded to medical officers belonging to the health administrations of ten different countries."

After discussion this Committee proposed the following resolution to the Assembly, which was adopted on the 7th October, 1933:—

"The Assembly;

"Values highly the results obtained in the Health Organisation's various fields of work;

"Attaches special importance to the work accomplished by that Organisation, particularly as regards the campaigns against malaria, tuberculosis, diphtheria, and infant mortality, as well as in connection with biological standardisation;

"Is gratified at the increasing importance of the part played by the Eastern Bureau in the prevention of pestilential diseases;

"Notes with satisfaction that the countries which have requested the Health Organisation's technical collaboration have received all the assistance which they desired;

"Takes note of the report [pages 92 to 97 document A.6 and pages 43 to 45 of document A.6 (*a*) 1933, III] which has been submitted on the work of the Health Organisation, and approves the general work carried out by that Organisation since the last session of the Assembly."

Kamaran Quarantine Station, Red Sea.

60. The civil and general administration of the island is under the Government of India, but the medical administration of the Quarantine Station is under joint Anglo-Dutch control. The pilgrimage of 1932-33, which lasted for 4 months, opened with the arrival of the S. S. "Automedon" from the Straits Settlements on the 28th November 1932 and closed with the departure of the M. V. "El. Amin" from the Arabian coast on the 29th March 1933. Twenty steamers of which 16 were British and 4 Dutch, with 13,598 pilgrims, passed through Kamaran and were dealt with in accordance with the measures prescribed for "healthy" ships in Article XXVI of the Schedule to the Anglo-Dutch Agreement of 1926. These included 10,816 from British India, 2,009 from the Dutch East Indies, 512 from the Straits Settlements and 261 from the Arabian Coast. No "infected" or "suspected" steamers were dealt with, as the general health of the pilgrims was very good. Despite a severe epidemic at Bombay and Calcutta, only 1 case of modified smallpox and 1 of chicken-pox were reported on ships arriving from British India. Only 11 deaths were recorded on pilgrim ships; 9 on 6 steamers from British India and 2 on a vessel coming from the Dutch East Indies. One birth occurred on board a ship from Java.

Of the total, 13,337 pilgrims were exempted from landing as they were protected against cholera and smallpox; 261 were landed for disinfection, etc.

Port Quarantine.

61. Under the Devolution Rules of 1920 "Port Quarantine and Marine Hospitals" is a central subject, whilst "Public Health and Sanitation" are provincial, but "subject to legislation by the Indian Legislature in respect to infectious and contagious diseases to such an extent as may be declared by any Act of the Indian Legislature." The Statutory Commission appointed in 1927-29 has not suggested a change in the above procedure. Under Article 51 of the International Sanitary Convention, 1926, as a preliminary to ratification, the Government of India is at present examining the question of the provision in the large seaports of—

(*a*) an organised medical service and permanent medical supervision of the health condition of crews and of the population of the port.

(*b*) Equipment for the transport of the sick and suitable accommodation for their isolation and for keeping suspected persons under observation.

(*c*) Installations necessary for efficient disinfection and disinsectisation; a bacteriological laboratory and arrangements to permit of immediate vaccination against smallpox or other diseases.

(*d*) A supply of drinking water of quality above suspicion at the disposal of the port and a system as effective as possible for the removal of excrement, refuse and sewage.

(*e*) A competent and adequate staff and necessary equipment for the deratisation of ships, shipyards, docks and warehouses.

(*f*) A permanent organisation for the trapping and examination of rodents.

Similar provisions were included in Article 36 of the Convention of 1903 which was ratified by the Government of India and by which it is still bound until it ratifies the Convention of 1926. Thus port administration in India is carried out by the maritime local governments as agents for the Government of India. Section 17 of the Indian Ports Act, 1908, empowers them to appoint Port Health Officers and Assistant P. H. Os. The position of these

officers is unsatisfactory, not only because they have no connection with shore sanitation but because their powers are inadequate even within the water area of the port itself, *e.g.*, in respect of the prevention of nuisances and the destruction of unwholesome food, etc. At present no inspection of ships for general sanitary purposes is carried out at Indian ports as a matter of routine, but P. H. Os. are responsible for all measures in connection with infectious or contagious diseases, whilst the Mercantile Marine Department Surveyors see that the cubic capacity and decks areas are adequate and that the ship is properly constructed as regards ventilation, lighting, water supply, etc. Except in special cases, such as pilgrim ships, there is little if any inspection as to general cleanliness, the efficiency of sanitary fittings, quality of water supply, etc.

The present system of Port Health Administration in India has long been recognised to be in need of revision on modern lines and proposals have been under the consideration of the Government of India at various times for the constitution of port sanitary authorities in India who will not only be responsible for the general sanitation of the area in their charge but also for the control of infectious disease occurring within that area, whatever its origin. The Government of India have offered to meet half the cost of such authorities in the major ports and the salary of a part-time or whole-time Health Officer in other ports, where such appointments may be necessary, and to refrain from the imposition of any special levy on shipping with a view to meet the cost involved. Where Port Trusts exist, these bodies may equitably be called upon to contribute from their general revenues, which are derived from shipping, a moiety of the cost of the Port Sanitary Authorities, and in most cases they are already actually making a contribution to this extent towards the expenses of port sanitary administration. It is hoped that finality in the matter will be reached before long, especially in view of the fact that, in anticipation of ratification of the I. S. C., 1926, the Government of India have already agreed to come into line with other countries in regard to Article 7, whilst the information required under Articles 1, 2, 3, 4, 6, 12 and 16 has been communicated since 1928 through the Singapore Bureau to the Office International in Paris. In order to meet modern requirements and to comply with the provisions of the I. S. C., 1926, the Port Health Rules which were framed in 1917 are at the time of writing this report undergoing a very necessary revision.

Under Government of India, Department of Commerce, Notification No. 5-M. II (4)/31, dated the 12th December, 1931, Port Health Officers were required to inspect the provisions of lascar crews, etc., as required under Section 91 of the Indian Merchant Shipping Act. Many instances of adulterated *ghee* having come to notice, the Government of India, Commerce Department, issued a notification No. 70-M. II (3)/32, dated the 13th March, 1934, which laid down the procedure to be followed in regard to the inspection of *ghee* supplied for the use of lascars or other Indian seamen on board ships. The notification runs as follows :—

"The daily scale of provisions for lascars and other Indian seamen employed on foreign-going and home-trade ships includes a quantity of *ghee* for which the following specification has been prescribed :—

"*Ghee* should be of pure buffalo's or cow's butter. It should have a pleasant smell and taste and should in the solid or semi-solid state exhibit fine grains like sand grains. It should never be adulterated with animal fat or vegetable oil."

2. In practice, the interpretation of the above specification by Port Health Officers who have been authorised under section 91 of the Indian Merchant Shipping Act, 1923, to inspect crews' provisions varies from port to port and this lack of uniformity has given rise to persistent complaints from shipping companies. The Government of India realise

that shipping companies may be put to considerable inconvenience and expense if *ghee* passed at one port as fit for the use of lascar seamen is rejected by the Inspecting Officer at another port on the ground that it does not conform to the analytical standard prescribed by the local Government in whose territories the latter port is situated. At the same time they think that it is impracticable to lay down a uniform standard of purity for *ghee* for the guidance of Inspecting Officers at the various ports. The Government of India have, therefore, decided that the Inspecting Officers in one port in British India should not reject *ghee* which has been passed at another port in British India.

3 In order that *ghee* which has been inspected and passed by a competent authority may be readily identified, the Government of India desire that consignments of *ghee* inspected at any port and found to conform to the prescribed specification should be sealed with a special leaden seal which will hold good for a definite period and bear the name of the Inspecting Officer and the date on which the consignments are passed. Where a consignment of *ghee* to be used as crews' provisions has been so sealed the Inspector at another port shall merely satisfy himself that the official seals are intact and the period for which they hold good has not elapsed. The inspection of all such stores should be carried out on board ship. After inspection the tins containing *ghee* should be wired, sealed with a leaden seal, labelled and stamped with a rubber date stamp. The seal should bear the letters " P. H. O." over the identification letters of the port of inspection. The label should be in the standardised Form P. W. 2 (India). The rubber date stamp to be used on the label should on the space inside the oval contain beside the date of inspection the date on which the *ghee* should be re-examined thus :—

Inspected (Date).
Good till (Date).

The period should in no case exceed six months.

4. The labour in connection with the wiring of the packages should be provided by the shipowners but the seals, impress clippers, rubber stamps and wire as well as the labels will be provided by Government. The labels, seal, clippers, etc., should be obtained by the Shipping Masters as required by the Port Health Officers at their ports, the labels being obtained on indent and the other materials purchased locally, the cost being charged to the Shipping Office contingent grant.

5. A fee of rupee one per package sealed, subject to a maximum of Rs. 15 on the occasion of each visit of the Inspecting Officer, should be realised from the shipowners or their agents. Shipowners requiring supplies of *ghee* sealed after inspection should forward their applications in Form P. W. I (India) through the Shipping Master at the port, who on receipt of the fee shall endorse the form with a note that the fee has been paid and that the supply of *ghee* should be sealed after inspection and then pass the form on to the Port Health Officer.

6. The above scheme shall for the present apply to the ports of Bombay, Calcutta, Karachi, Madras and Rangoon only. The identification letters of these ports shall be as shown below :—

Bombay Bo ; Calcutta C ; Karachi K ; Madras M ; Rangoon R."

Major Ports.

62. *General*: For the large sea-port towns in India, mortality figures are given in Table V (*i*) under 12 different headings.

TABLE V (*i*).

	Bombay.		Calcutta.		Madras.		Rangoon.		Karachi.	
	Deaths.	Rate p.m.	Deaths.	Rate p.m.	Deaths.	Rate p.m.	Deaths.	Rate p.m.	Deaths.	Rate p.m.
Total .	21,174	23·4	35,175	29·4	24,500	36·1	8,842	22·2	6,307	25·5
Smallpox . .	2,659	2·3	4,181	3·5	837	1·3	14	...	167	0·7
Cholera . .	17	...	1,216	1·0	62	0·1	1	...	...	...
Plague . .	48	...	1	...	...	...	9	...	...	...
Enteric fever .	241	0·2	954	0·8	90	0·1	52	0·1	46	0·2
Malaria . .	71	...	828	0·7	140	0·2	166	0·3	30	0·1
Kala-azar . .	...	...	233	0·2	16	...	2	...	...	...
C. S. fever . .	...	...	...	...	...	...	...	...	...	...
Influenza . .	76	0·1	710	0·6	10	...	6	...	...	...
Measles . .	86	0·1	233	0·2	44	0·1	2	...	442	1·8
Dysentery . .	230	0·2	1,365	1·1	1,481	2·2	192	0·5	123	0·5
Tuberculosis .	1,594	1·4	2,387	2·4	1,011	1·5	815	2·0	485	2·0
All other causes .	22,152	19·0	22,557	18·8	20,809	30·6	7,582	19·0	5,014	20·2

Table V (*ii*) gives particulars of (*a*) rats killed in ports and on board ships, (*b*) deratisation of ships and (*c*) deratisation certificates.

TABLE V (*ii*).

I.—Rats destroyed in the ports.

	Destroyed.	Examined.	Found infected with plague.
Bassein	4,236	2,130	17
Bombay	8,236	8,236	..
Calcutta	11,987	639	..
Chittagong	155	155	..
Cochin	..	..	..
Karachi	1,860	279	..
Madras	..	..	..
Moulmein (town)	7,905	773	1
Rangoon	7,277	2,828	..

II.—Rats destroyed on board ships and method of deratisation employed.

	Ships deratised.	Method of deratisation.	Destroyed.	Number of rats examined.	Plague infected.
Bombay	25	SO_2 and trapping.	626 by fumigation. 80 by trapping.	536	*Nil*
Calcutta	37	SO_2	252	47	*Nil*
Rangoon	20*	SO_2	152	152	*Nil*
	12†	Trapping.	41	41	*Nil*

* One vessel was fumigated on account of a suspected case of plague.

† Vessels trapped before issue of deratisation exemption certificates.

III.—Issue of deratisation and deratisation exemption certificates.

	Deratisation certificates.	Deratisation exemption certificates.
Bombay	25	15
Calcutta	37	27
Karachi	..	1
Rangoon	19	12

Port of Bombay.

63. Lt.-Col. C. L. Bilderbeck, I.M.S., continued in charge of the Port Health Department.

909 vessels of all classes, carrying 134,549 persons (crews and passengers), were examined and disinfection was carried out of the clothing, bedding and other belongings of 39,849 persons, including 35,751 Asiatic and African members of crews, third class or deck passengers, 3,777 pilgrims and 321 members of crews and passengers who arrived by vessels in which cases of infectious diseases had occurred during the voyage or whilst in port. In addition, 25,644 coolies and others were inspected to enable certain vessels to work cargo.

Outgoing vessels.—780 vessels with 96,976 persons (54,694 crews and 42,282 passengers) were inspected. These figures are exclusive of troops who were examined by the military embarkation staff. In accordance with Government Notification, General Department No. 1713, dated the 15th March, 1917, medical examination and disinfection of the clothing and bedding was carried out of (*a*) 25,434 Asiatic and African members of crews, (*b*) 10,317 third class passengers (not provided with cabin accommodation), and fourth class and deck passengers, Asiatic and African servants and (c) 3,777 pilgrims leaving for ports beyond India.

Eight vessels arrived with cases of influenza, chicken-pox, measles and mumps among their crews and passengers and departed within 12 days of arrival. The Bills of Health granted to these vessels were endorsed to show the diseases which had occurred on board as well as the preventive measures taken.

Medical inspection and disinfection of all "infected" or "suspected" vessels were carried out; all pilgrim ships were inspected on arrival

Incoming vessels.—Inspections were made of 121 vessels carrying 14,676 crews and 22,883 passengers and pilgrims. Including hired transports, 20 of these had either cases of infectious disease on board during the voyage or at the time of arrival. These included measles 3 cases, chicken-pox 22, jigger 4, influenza 2, pneumonia 2, scarlet fever 2, mumps 2 and typhus 1. Cases which occurred in hired transports were on landing, dealt with by the military authorities; those among European crews and passengers were dealt with by the port health department.

Eight cases of chicken-pox, 1 of measles and 1 of smallpox occurred on 7 vessels lying in harbour. The clothing and bedding of 43 persons on these were disinfected. Two cases of chicken-pox and 2 of smallpox were landed at Aden from vessels which sailed from Bombay; 1 of chicken-pox and 3 of measles at Mombasa and 1 of typhoid during a voyage to Japan.

Disinfection.—Seven vessels were disinfected on account of infectious disease. Under Article 28 of the I. S. C. 40 deratisation and deratisation exemption certificates were issued; 25 ships were deratised by sulphur fumigation and 15 were inspected for exemption certificates, In addition, 8 pilgrim ships were fumigated. The disinfection station dealt with 1,229 bundles of clothing and bedding received from different hospitals. No deaths due to mephitic gas poisoning occurred during the cleansing of ship bilges, but 304 accidents with 4 deaths occurred on board vessels in the harbour or docks.

Table V (*iii*) summarises the anti-rat operations carried out in compliance with Article 28 of the I. S. C. together with those conducted in the city by the municipality.

TABLE V (*iii*)

	Rats.						Ships deratised b	
	Killed.		Examined.		Plague infected.		Fumigation.	Fumigration and trapping.
	Town.	Docks.	Town.	Docks.	Town.	Docks.		
Total	736,934	8,236	255,099	8,236	394	...	...	25
January	64,252	606	24,263	606	23	...	...	1
February	59,637	557	26,741	557	57	...	...	5
March	62,446	586	27,043	586	126	...	...	2
April	56,938	650	18,859	650	114	...	...	1
May	62,637	728	23,189	728	35	...	...	5
June	57,069	652	18,816	652	18	...	...	2
July	57,959	732	17,704	732	5	...	...	1
August	60,488	767	19,591	767	3	...	...	...
September	59,838	850	18,676	850	3	...	...	...
October	61,240	657	18,754	657	3	...	...	1
November	68,022	802	22,582	802	6	...	...	4
December	66,408	649	18,881	649	1	...	...	3

		Rats on board.				Certificates issued.			
						Deratisation.		Exemption.	
	No. of ships.	Killed by trapping.	Killed by fumigation.	Examined.	Found infected.	Loaded.	Unloaded.	Loaded.	Unloaded.
Total	25	80	626	536	...	...	25	12	3
January	1	...	3	3	...	...	1	...	...
February	3	5	24	29	...	...	5	...	...
March	2	...	...	3	...	...	2	3	...
April	1	8	10	18	...	...	1	1	...
May	5	10	290	255	...	...	5	...	...
June	3	37	...	32	...	...	2	1	...
July	1	5	54	37	...	...	1	2	...
August	...	...	...	...	...	...	...	...	...
September	...	...	...	...	...	...	...	1	1
October	1	1	17	1	...	...	1	1	...
November	4	7	119	86	...	...	4	1	...
December	4	3	109	72	...	...	3	2	2

Outward pilgrim traffic.—Before embarkation of pilgrims, all ships were thoroughly cleansed and deratised by the Clayton process. Medical inspection and disinfection of clothing and bedding of pilgrims likely to have been exposed to infection were also carried out before embarkation. 3,777 pilgrims in 6 vessels sailed for Jeddah between the 19th January, 1933, and 14th March, 1934. Before embarkation 3,110 pilgrims were vaccinated by a special staff and 3,464 were inoculated against cholera.

Inward pilgrim traffic.—1,061 members of crews and 3,307 passengers in 11 vessels who arrived from Jeddah were inspected. 21 deaths occurred during the voyage and 16 cases of infectious disease were found on board on arrival.

Under Government of India, Department of Commerce, No. 5-M.-11(4), dated the 26th September, 1931, 378 inspections of lascars' provisions on board ships were made and Table V (*iv*) gives details of the samples taken and examined by the Chemical Analyser.

TABLE V (*iv*).

	Samples.	Passed.	Condemned and replaced.
Ghee	88	57	31
Rice	6	1	5
Flour	1	..	1
Dal	4	1	3
Butter	4	3	1
Corriander	7	..	7
Tea	3	3	..
Lime juice	6	1	5
Chillies	1	..	1

28 members of crews and 21 passengers were detained for diagnosis and of these 20 and 9, respectively, were not allowed to embark.

During the last 6 months of the year for which period statistics are available, out of a total of 12,042 local passengers embarking *ex*-India 580 or 4·8 % (10·1 % in 1932) were found to be unvaccinated or were inadequately protected against smallpox; whilst amongst 3,689 through passengers who made a passing call at this port, 531 or 14·3 % (27·8 % in 1932) were unvaccinated. Of the 4,908 local passengers in P. & O. ships, 314 or 6·4 % (10·1 % in 1932) were unvaccinated. In respect of through passengers the "unprotected" percentage was 22·5 as against 28 in 1932. On the other hand, crews continued to be a potential source of infection for overseas ports, as no less than 1,231 members of crews were found to have been unvaccinated within the past 5 years, whilst many members of these crews had not been vaccinated since infancy.

The sanitary state of the harbour and the various *bunders* and docks was generally satisfactory throughout the year.

Port of Karachi.

64. Dr. B. F. Khambata, D.P.H., was the Port Health Officer, except for the period 24th March to 8th December, when senior Assistant Surgeon J. E. Howard, D.P.H., I.M.D., Assistant Port Health Officer, officiated.

General.—The port and city of Karachi were completely free from plague and cholera throughout the year and no epidemic of a serious nature occurred on any incoming vessel. The sanitary condition of the harbour was generally satisfactory.

Bills of Health were granted to 49 incoming vessels, including 46 steamers, 10 pilgrim ships and 3 country craft, and 606 outgoing vessels including 289 steamers and 317 country craft. These had on board a total of 56,756 passengers and crews of which 14,176 were on incoming and 42,580 on outgoing vessels.

No cases of plague, cholera, acute pneumonia, beri-beri, yellow fever, jigger, sleeping sickness, c. s. fever or influenza were recorded. Two cases of smallpox were detected at the time of disinfection and medical inspection of deck passengers of S. S. " Bandra " on the 26th February ; another case amongst the engine room ratings on H. M. S. " Enterprise " was removed to the hospital by the embarkation military medical authorities on the 5th December. 11 cases of chicken-pox were landed ; 6 of these among the families of British troops were removed by the embarkation military medical authorities and the rest were treated in the Epidemic Diseases Hospital. Other diseases reported included 1 case of measles, 2 of mumps and 1 of scarlet fever.

The outward pilgrim traffic commenced with the first pilgrim ship, S. S. " Akbar ", which sailed on the 5th December, 1932, and ended with S. S. " Rizwani " which sailed on the 21st March, 1933. Only 1 vessel carrying 1,797 pilgrims sailed for Jeddah and 7 others from Bombay called *en route* to Jeddah and 4,643 pilgrims were embarked from this port.

Inward pilgrim traffic.—Ten ships arrived and disembarked 7,996 pilgrims. No death due to any notifiable infectious disease was reported during the whole inward pilgrim season. 23 deaths from non-notifiable diseases occurred on these vessels during the voyage, chiefly due to general debility and the effects of hardships suffered during the *Haj*. 50 cases were in ships' hospitals on arrival.

Only 1 vessel was granted a deratisation exemption certificate. Provisions and stores for the use of the Asiatic crews of 34 vessels were inspected under section 91 of the Indian Merchant Shipping Act, 1923 (XXI of 1923). None of the rats examined were found infected.

Air traffic.—182 Bills of Health were granted to air-craft ; 643 crews and 459 passengers leaving the port were medically inspected.

The air-line companies operating from and to Karachi were (i) the Imperial Airways, Ltd.; (ii) the Compagnie Air Orient Company (Fr.) ; and (iii) the K. L. M. Royal Dutch Air Mail Company. In addition, 12 British, 1 French and 1 German private planes also used the air-port.

Port of Calcutta.

65. Dr. J. B. McVail, the Port Health Officer, died on 6th January, 1933, and his assistant carried out the duties during the rest of the year. Owing to the abolition of the post of the fourth assistant health officer the routine inspection of incoming ships was confined to only " infected " or " suspected " vessels.

Vessels entering totalled 1,164 and 1,156 vessels left the port. 18 inward and 1,117 outward-bound ships were inspected ; 1,478 members of crews and 3,834 passengers on incoming vessels and 89,562 and 67,533, respectively, on outgoing vessels were passed during quarantine inspection, whilst 87 members of crews and 321 passengers on outward-bound vessels were not passed. Owing to the freedom of the town and port areas from plague, routine disinfection of the clothing and bedding of Asiatic and African members of the crews and third class deck passengers of outgoing ships was not carried out. 10,603 boats, lighters, etc., were inspected by the sanitary inspector and 75 cases of sickness were reported.

Six deaths amongst European seamen were registered, 3 due to drowning and 1 each to heart failure, suicide and cerebral apoplexy. Among the 21,242 European seamen arriving at this port, an admission to hospital rate of 13 *p. m.* was reported ; deaths numbered 5 or 0·2 *p. m.* The chief causes

of admission included venereal diseases 23, dysentery 16, influenza 10, enteric fever 5, smallpox 4, malaria 3, cholera 2 and sunstroke 2. Deaths among Asiatics totalled 140 and included fever 45, drowning 42, injury 22, dysentery 9, heart failure 7, diarrhœa 4, leprosy 4, bronchitis 2, opium poisoning 2 and cholera, tetanus and burning 1 each. 145 hospital admissions with 12 deaths were recorded amongst Asiatic seamen and boatsmen.

Five incoming ships which had cases of infectious disease on board were disinfected. No case of infectious disease was reported from undecked native seagoing craft. No case of sleeping sickness was found on vessels coming from East African ports. No alien leper entered the country.

The clothing and bedding of crews and passengers were as usual steam sterilised at the disinfecting sheds in the Kidderpore Dock (2), King George's Dock (1), *Babu Ghat* (1). 18 seagoing vessels, 24 inland steamers, flats and launches and 22 lighters, *bars* and *dinghis* were disinfected and 37 seagoing vessels were fumigated by means of the Clayton apparatus. 37 deratisation certificates and 27 deratisation exemption certificates were issued. Two of the 3 samples of *ghee* used as rations for lascar crew and examined at the Bengal Public Health Laboratory were found to be genuine ; 1 was reported to be of mixed cow and buffalo *ghee*.

In addition to 11,987 rats killed by the Port Commissioner's staff within the docks and the jetties, a total of 686 rats caught in the port were examined but none were found infected.

The quantity and quality of the municipal filtered water supplied to ships was satisfactory.

At the request of the shipping agents, 664 deck passengers on 51 ships proceeding to the Straits were vaccinated at a fee of annas 6 per head. 150 persons of the floating population of the port were vaccinated free of charge.

Nine corpses and 938 carcasses were found floating or sunk within port limits.

Only one pilgrim ship, the S.S. "Alavi", carrying 297 pilgrims left for the Hedjaz. All pilgrims and the ship's staff and members of crew were vaccinated against smallpox and inoculated against cholera by the staff or the provincial and municipal Public Health Departments. A woman doctor was employed for 1 month for similar work among women pilgrims. The usual sanitary arrangements were made for the embarkation of pilgrims for the Ganga Sagar *Mela*.

Port of Madras.

66. Madras is usually only a port of call, except for vessels going to Rangoon, Singapore, etc. An A. D. P. H. acts as part-time P. H. O.

623 vessels carrying 58,475 members of crews and 55,596 passengers arrived ; 548 outgoing vessels carrying 49,108 members of crews and 37,310 passengers were inspected and granted Bills of Health. Four cases of chickenpox, 2 of smallpox and 1 of cholera were landed and treated in the Tondiarpet Infectious Diseases Hospital. The disinfection of bedding and clothing of incoming and outgoing deck passengers and crews was continued at the discretion of the Port Health Officer. The disinfection shed was in charge of a sub-assistant surgeon and a nurse was employed for the inspection of female passengers.

No rat mortality occurred on any of the vessels that entered the harbour.

Port of Rangoon.

67. Dr. J. A. Anklesaria, D.P.H., was the Port Health Officer.

In addition to 6,410 passengers arriving from Burman ports, 112,151 members of crews and 223,793 passengers on 1,194 vessels from Indian (835) and foreign ports (359) were inspected. 14 cases of infectious disease were reported from 9 vessels and included cholera 1, smallpox 4, chicken-pox 1 and measles 8. Of these 1 case of smallpox had been detained at a previous port of call; the other 13 cases were treated in the contagious diseases hospital, Rangoon. Five cases of smallpox, 19 of chicken-pox and 8 of measles were detected on 24 vessels during the course of medical inspections and these also were removed to the contagious diseases hospital. 21 lepers were also found on the incoming vessels; of these 20 were allowed to proceed to their homes and 1 was sent to a leper asylum. 15 deaths from non-infectious diseases were reported on 15 vessels.

230,203 passengers were inspected under the Vaccination Act; of these 90,631 were found protected against smallpox and 139,572 were vaccinated. In addition, 3,356 vaccinations were performed among the members of the crews. The effects of 258 members of crews, 855 passengers and 136 baggage coolies were disinfected.

One death was reported from a launch of the Irrawaddy Flotilla Company.

Outward traffic.—The effects of 35,913 Asiatic and African members of crews and 13,682 deck passengers on 535 vessels were disinfected and 10,555 European members of crews and 3,768 saloon passengers were inspected. 158 members of crew and 480 passengers were vaccinated. 4,073 baggage *coolies* were inspected and their clothes and uniforms were disinfected prior to their handling passengers' baggage. 41 cases of suspicious illness were allowed to embark on the commanders' responsibility; 11 were sent to hospital; and 2 were allowed to go to their residences. Of the 3,154 members of crew inspected prior to their signing ships' articles, 3,137 were passed fit and 17 rejected.

Five deaths from non-infectious disease, 2 cases of chicken-pox, and 1 each of mumps and influenza were reported on vessels in the harbour; 4 vessels and 103 members of crew underwent disinfection. Measures to prevent the ingress of rats into vessels at wharves and in the stream were carried out.

19 vessels were fumigated to comply with the measures in force at the port of destination. One vessel was fumigated at the cost of the Port Health Department on account of a suspected case of plague on board and deratisation exemption certificates were issued to 12 vessels. Repairs and overhaul of the Clayton machine were carried out and the latest tests of fumigation have been fairly satisfactory, whilst it is now possible to fumigate ships more expeditiously. Three anti-plague and 128 anti-cholera inoculations were given to members of crews. The provisions for the Asiatic crews on 65 ships were inspected and of 44 samples examined, 3 of rice, 1 of *ghee* and 1 of mustard oil were found adulterated.

The sanitation of the Port Commissioner's area was maintained at a high standard. The sanitary staff for this area included 1 public health inspector, 2 assistant public health inspectors and 1 public health sub-inspector. 2,729 vaccinations were performed. The rats destroyed totalled 7,277 and of 2,848 rats examined, none were found infected.

Port of Aden.

68. Lt.-Col. E.S. Phipson, I.M.S., was P.H.O. Bills of Health were granted to 1,576 ships and rigged vessels ; these included 1,120 sailing under the British and 456 under foreign flags. 32 cases of infectious disease were reported on 16 British vessels. Of these cases, 2 were smallpox, 12 chicken-pox, 4 measles, 1 pneumonia and 13 influenza. Two cases of smallpox and 2 of chicken-pox were landed ; the others were isolated on board.

No cases of infectious disease occurred among the 4,461 passengers on board the pilgrim ships which passed this port. All were medically examined but were not granted pratique.

The Health Officer continued to act as the inspecting officer of the port under section 91 of the Indian Merchant Shipping Act, 1923, *vide* Government of India Notification No. 5-M-II(4)/33, dated the 26th September, 1931. Medicine chests were inspected on 5 vessels and were found in an unsatisfactory condition ; only 1 ship was inspected for provisions. The disinfection stove on Flint Island quarantine station was maintained.

SECTION VI.

VACCINATION AGAINST SMALLPOX.

A.—British India.

General.

69. Once more, because of the higher incidence of smallpox, vaccination operations in British India increased from 20,587,799 in 1932-33 to 22,143,370. The increase of 1,639,392 revaccinations was almost wholly due to the large increases under this head in the Madras Presidency (1,902,368) and in Burma (117,150). Of the 9,678,876 registered infants only 43 % were successfully protected. Nearly 97 % of the primary and 51 % of the revaccinations were recorded as successes; details for each province are given in Table VI (*i*). Success rates for the different provinces are given in the graph facing this page.

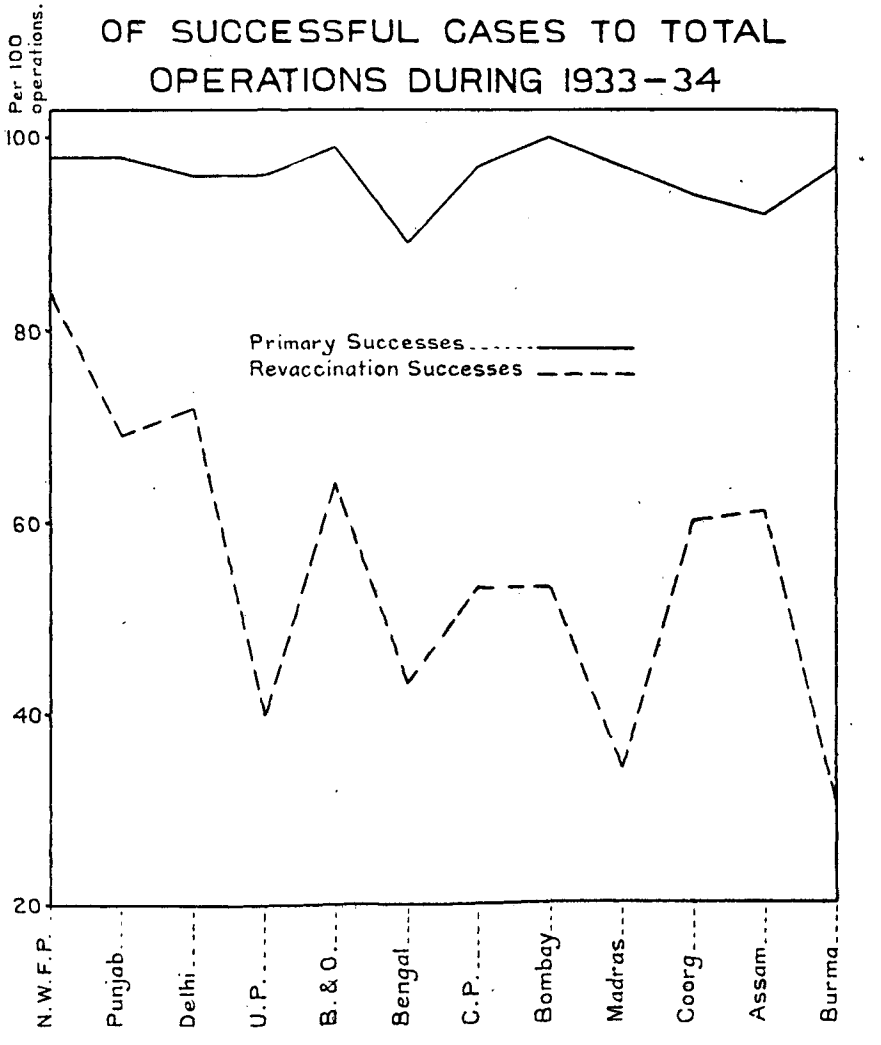
No cases of post-vaccinal encephalitis were recorded.

TABLE VI (*i*).

		Vaccinations.		Per cent. success.		Cost per successful case.
		P.	R.	P.	R.	Rs. A. P.
British India .	1933-34	**9,919,054**	**12,224,316**	**96·6**	**50·5**	**0 4 0**
	1932-33	10,002,875	10,584,924	97·0	54·8	0 4 0
N.-W. F. P. .	1933-34	**206,382**	**141,242**	**98·3**	**84·1**	**0 1 6**
	1932-33	177,115	129,618	98·5	80·2	0 1 7
Punjab . .	1933-34	**950,385**	**2,255,971**	**98·1**	**69·3**	**0 2 10**
	1932-33	1,003,564	2,603,721	98·4	69·8	0 2 4
Delhi . .	1933-34	**16,979**	**18,958**	**96·0**	**71·7**	**0 5 1**
	1932-33	34,275	155,608	95·4	44·4	0 1 11
U. P. . .	1933-34	**1,522,517**	**241,726**	**96·0**	**39·8**	**0 4 0**
	1932-33	1,446,587	277,055	95·6	33·5	0 4 2
B. & O. . .	1933-34	**1,065,592**	**851,134**	**99·4**	**64·3**	**0 1 8**
	1932-33	1,102,435	446,201	99·7	60·2	0 1 11
Bengal . .	1933-34	**2,532,230**	**4,107,104**	**89·3**	**42·6**	**0 1 9**
	1932-33	2,522,872	4,162,351	89·6	43·4	0 1 9
C. P. . .	1933-34	**570,833**	**117,798**	**97·2**	**52·9**	**0 5 7**
	1932-33	562,633	100,058	93·3	44·0	0 5 11
Bombay . .	1933-34	**688,659**	**301,371**	**99·9**	**52·7**	**0 12 9**
	1932-33	710,178	529,742	99·9	54·6	0 13 0
Madras . .	1933-34	**1,297,829**	**3,254,926**	**96·7**	**33·5**	**0 5 8**
	1932-33	1,406,717	1,352,558	98·6	38·7	0 6 2
Coorg . .	1933-34	**7,524**	**8,053**	**93·5**	**59·6**	**0 8 5**
	1932-33	7,252	7,428	95·8	59·9	0 8 5
Assam . .	1933-34	**402,375**	**304,085**	**91·8**	**61·3**	**0 3 9**
	1932-33	369,975	315,854	94·8	62·4	0 3 8
Burma . .	1933-34	**634,233**	**619,653**	**96·7**	**31·4**	**0 10 3**
	1932-33	637,649	502,503	95·7	33·2	0 9 10
Ajmer-Merwara .	1933-34	**23,516**	**2,295**	**95·0**	**96·7**	**0 5 6**
	1932-33	21,623	2,227	93·9	91·9	0 5 6

№ 7

VACCINATION GRAPH SHOWING PERCENTAGES OF SUCCESSFUL CASES TO TOTAL OPERATIONS DURING 1933-34



Vaccine Institutes and Supply of Vaccine.

70. Glycerinated lymph, manufactured at provincial vaccine institutes, continued in use throughout British India, Nijland's method being generally employed in maintaining the potency of the seed lymph.

Manufacture and despatch.—Supplies of glycerinated chloroform lymph for the *N.-W. F. P.* were obtained as usual from the Punjab Vaccine Institute. In the *Punjab*, lymph was prepared according to the Forster-Java method and there was no change in the method of its despatch. In *U. P.*, new methods for the despatch of vaccine lymph were tried. As these proved economical, the former practice of issuing vaccine lymph in small quantities in wooden boxes was discontinued and supplies are now issued in bamboo reeds, whilst bulk supplies are now despatched in glass vials instead of metal collapsible tubes. In *C. P.* and *Assam*, glycerinated calf lymph prepared at the provincial vaccine institutes continued to give satisfactory results. At the King Institute, *Madras*, and at the *Burma* Vaccine Institute the modified Nijland's method of passage for seed lymph was practised.

Yield.—In the *Punjab*, the average yield of pulp was 140·5 grammes per buffalo-calf, 31·5 grammes per cow-calf and 1·7 grammes per rabbit. In the *U. P.*, the average yield of crude lymph was slightly lower at 51 grammes per calf; the average yields of crude lymph per cow-calf and buffalo-calf were approximately 24 and 54 grammes respectively. In *B. & O.*, the average yield of crude vaccine was over 38 grammes per animal. In *Bengal*, the average yield of pulp further rose to 382 grains per calf and the efficacy of the lymph was well maintained. The average output of lymph in *C. P.* was 81 grammes per buffalo-calf, 42 grammes per bovine calf and 1 gramme per rabbit. The yield per calf was 29 grammes at the King Institute, *Madras*. In *Assam*, the average number of tubes of lymph produced per calf was 1,890. In *Burma*, the average yield was 375 grammes per buffalo-calf and 98 per cow-calf.

Storage.—In the *U. P.* the cold storage plant and the electric installation worked satisfactorily and the temperature maintained in the cooling chambers was lower than that in the previous year. The cold room in Belgaum Institute in *Bombay* continued to maintain satisfactory conditions.

Tests.—In the *U. P.*, proposals for opening a laboratory to carry out bacteriological tests on vaccine lymph were sanctioned by Government and a new laboratory was started in the depôt in November, 1933. Tests for potency and purity of vaccine lymph were carried out before its issue and results obtained with the vaccine lymph showed complete absence of streptococci and gas producing anaerobes in every sample tested. The number of viable organisms per c.c. of vaccine lymph was less than 5,000 in 77% of the samples tested. The potency test on rabbits was performed with every batch of vaccine lymph and the test indicated that the vaccine was of uniformly good quality. In *Bombay*, the purity of all lymphs was tested as usual. In *Burma*, all lymph before issue was subjected to the Cunningham, Calmette-Guerin and human potency tests.

Training.—Training classes in vaccination were held as usual in the various provincial institutes.

Table VI (*ii*) gives details of the lymphs produced and issued from the various provincial vaccine institutes.

TABLE VI (*ii*).

Vaccine Institutes.	Number of doses. Output.	Issues
N.-W. F. P. Punjab } Lahore	6,448,390	6,776,900
U. P., Patwa Dangar	2,714,350	3,156,962
B. & O., Namkum (Ranchi)	3,537,767	3,582,589
Bengal, Calcutta	8,381,116	7,225,658
C. P., Nagpur	905,605	730,760
Bombay, Belgaum	1,488,305	1,434,575
Madras, Guindy *	7,673,840	5,374,160
Assam, Shillong	916,744	945,493
Burma, Meiktila	1,820,280	1,755,684

* For the period 1st October, 1933, to 30th September, 1934. The figures refer to 2 insertions per case.

N.-W. F. P.

71. The staff consisted of 6 superintendents of vaccination and 52 vaccinators (including 11 temporary vaccinators).

The increase in the vaccinations performed during the year was partly due to the fact that smallpox was prevalent and partly to the extension of the Vaccination Act to various cantonments. Successful primary vaccinations numbered 195,880, including 99,970 of infants under 1 year of age and 74,948 of children between 1 and 6 years; successful revaccinations totalled 107,851. The rate of successful vaccinations was 86 per 1,000 of the population.

Punjab.

72. No important change in the administration of vaccination took place during the year; superintendents of vaccination numbered 45 and vaccinators employed by local bodies 533. The number of primary vaccinations was 53,179 less than the preceding year, whilst revaccinations were also smaller by 347,750, but these figures exceeded the record of 1931-32 by 1,440,205. The D. P. H. points out that the number of vaccination operations is not, to be exact, an absolute figure for purposes of comparison independent of other factors. Whilst primary vaccinations are dependent on the number of births, both primary and revaccination operations are materially influenced by the incidence of smallpox. Judged in this light, the D. P. H. considers that the year's work exhibits better results than those obtained in the previous record year.

	Deaths from smallpox.	Vaccination operations	Vaccinations per smallpox death.
1932-33	9,726	3,607,285	371
1933-34	6,990	3,206,356	459

The reduction in the number of operations seems to be almost entirely attributable to the decreases in municipal as compared with rural areas.

	Total No. of operations.	Municipal areas.			Operations in rural areas.
		Primary vaccinations.	Re-vaccinations.	Total.	
1932-33 . .	3,607,285	116,708	596,551	713,259	2,394,026
1933-34 . .	3,206,356	99,044	206,134	305,178	2,901,178
Difference .	—400,929	—17,664	—390,417	—408,081	+7,152

It must, however, be stated that the field for revaccination was not so great in urban as in rural areas. Towns-people of all ages were revaccinated in large numbers owing to epidemic conditions during 1932-33 and most of those amenable to operation either by reason of their education or as a result of propaganda had already been vaccinated and required no further protection.

Delhi Province.

73. The 4 municipalities employed 8 whole-time vaccinators; in rural areas only 3 were so employed.

The remarkable decrease in revaccinations was due to lesser prevalence of smallpox. The average number of vaccinations performed by each vaccinator was 2,018 in urban and 6,596 in rural areas. Sub-assistant surgeons and sanitary inspectors also performed these duties whenever necessary.

Revaccination amongst women who observe strict *purdah* is a difficult problem, as no female vaccinators were employed, but with the increase of women doctors and health visitors this difficulty is slowly being overcome. At the same time, these women cannot be expected to carry out active vaccination work to the detriment of their legitimate duties.

School medical inspection again brought to notice large numbers of unvaccinated young children.

United Provinces.

74. The staff comprised 49 assistant superintendents of vaccination and 955 vaccinators.

The total number of operations increased by 40,601 over the figure for the previous year and this was due almost entirely to the larger number of primary vaccinations performed. The percentage of successful operations to total births was only 50% among children under 1 year of age.

The public health staff inspected 3,669 schools for vaccination purposes and 34,315 scholars were vaccinated in their presence.

Although there was an increase in the total expenditure on vaccination owing to the employment of additional vaccinators in certain districts, the average cost of each successful vaccination fell slightly.

Bihar and Orissa.

75. The provincial staff included 11 district inspectors, 36 sub-inspectors, 1,182 licensed and 360 paid vaccinators. These numbers show a very large reduction in inspecting staff as compared with the previous year and it is to be hoped that no loss of efficiency will result. In municipal areas, vaccinations were performed by paid vaccinators, but licensed vaccinators were generally employed in rural tracts. Paid vaccinators were employed by local bodies and civil surgeons for short periods to deal with outbreaks of smallpox.

Vaccination has been reported to be an unpopular preventive measure in this province, but during the past 2 years the total number of operations has shown large increases. During 1933, no doubt as a result of an epidemic of smallpox, the number of vaccination operations increased by 368,090 over the figure for the previous year, although there was a decrease in primary vaccinations.

Of the total operations only 72% were successful as against 84% in the previous year, this being due to the large increase in revaccinations.

Unprotected children numbered 1,142,095. Of these only 279 p.m. were successfully vaccinated and even in municipal areas, only 438 p.m. of the surviving unprotected infant population were successfully vaccinated. These figures are unsatisfactory, showing as they do that more than half of the total infant population remained unprotected.

Bengal Presidency.

76. The staff, including those in Calcutta, numbered 95 inspectors of vaccination and 1,973 vaccinators; of these 74 inspectors and 1,738 vaccinators were employed in rural areas.

A decrease of 45,889 operations was recorded as compared with the previous year, revaccinations being 55,247 fewer and primary operations increasing by 9,358. 23,050 vaccinations were performed in tea-gardens, 53,924 in factories, 35,111 in railways, 924 on steamers and 57,103 in jails. A slight increase occurred in the number of children successfully vaccinated, the total numbers of those under 1 year being 303,146 and between 1 and 6 years 1,475,184. Vaccinations performed during the recess period numbered 1,294,441 (406,155 primary and 888,286 revaccinations). In rural areas 2,404,648 primary vaccinations and 3,476,114 revaccinations were performed, both groups showing a further increase; in municipal areas the total number was only 588,175 against 895,185 in the previous year.

256 p.m. of the available infant population was successfully vaccinated, the corresponding rates being 240 p.m. in rural areas and 551 p.m. in municipalities. These figures are not satisfactory.

Rotary lancets are now supplied to all municipalities and districts by the Bengal public health department. It has been unanimously reported that vaccination with this lancet is much superior to the scarification and linear incision methods.

Central Provinces.

77. The vaccination staff of 35 assistant superintendents and 324 vaccinators remained unchanged.

Of the total number of vaccinations performed which showed an increase of 25,940 operations (8,200 primary and 17,740 revaccinations) over the figures for the previous year, 674,062 were done by the special staff, 3,562 by the dispensary staff and 11,007 by other agencies, *i.e.*, railways, mines, tea-gardens, etc.

Out of a total of 559,870 unprotected infants under 1 year of age, 411,601 or 74% were vaccinated. In municipal towns and notified areas, unprotected children numbered 52,500 of whom 43,344 or 83% were vaccinated.

Bombay Presidency.

78. Of the total primary vaccinations 95% were successful and 0·09% unsuccessful whilst in over 5% the results could not be ascertained ; excluding these last, the percentage of success was 99·89. 459,184 or 67% of the total primary vaccinations were performed on infants under 1 year of age and 171,698 or 25% on children between the ages of 1 and 6 years. The number of revaccinations decreased ; 52% of the total were successful but in over 37% the results were not ascertained.

Vaccination in police lines and out-posts was regularly carried out ; as fair centres similar work was done well in advance of the fairs.

At Karachi, 4,825 pilgrims, including 3,859 males and 966 females, were revaccinated by a temporary staff during the months of November, 1933, to March, 1934, at a cost of Rs. 675-11-0.

Madras Presidency.

79. The number of vaccinators increased from 839 in 1932-33 to 862 in 1933-34. In this total, probationary vaccinators increased by 9, second class vaccinators by 22, whilst first class vaccinators decreased by 8. The reduction of first class vaccinators is regrettable and is due to the short-sighted policy on the part of certain *taluk* boards of filling first class vaccinators' posts by second class men. The increase in second class vaccinators was also due to the necessity for coping with additional work owing to the increased prevalence of smallpox. In addition, 274 health inspectors were employed.

As smallpox was widely prevalent in the Presidency, the health staff suspended their usual verification work during the off-season and devoted their whole attention to vaccinations. As a result, the total number of operations amounted to 4,552,755 (1,297,829 primary and 3,254,926 revaccinations)—an increase of 1,793,480 as compared with the previous year. This number was the highest in the annals of the public health department of the province.

Of the total operations, 53% were successful as against 70% in 1932-33. The number of vaccination operations performed in rural areas was 3,844,984; in municipal areas 648,176. The provincial success rate was nearly 45 p.m. In rural areas, successful vaccinations among children under 1 year of age numbered 558,702, the proportion of vaccinations to registered births varying between 61% and 18%. In municipal areas, successful vaccinations among children under 1 year of age was 95,641, the proportion of vaccinations to registered births varying from 97% to 26%.

In accordance with Government orders regarding the employment of women vaccinators in local board and municipal areas, Erode and Cochin

municipalities each employed one woman vaccinator and Cannanore and Tuticorin municipalities trained their municipal midwives in vaccination work.

Coorg.

80. Of a total of 15,443 persons vaccinated, 9,941 were males and 5,502 females ; 14,505 were in rural and 943 in urban areas.

Assam.

81. Vaccination among the general population was performed by 435 departmental vaccinators. On the tea estates, this work was done by the garden medical officers ; railway employees were vaccinated by their medical officers ; and in jails the work was done by the sub-assistant surgeons in medical charge.

Vaccination operations showed an increase of 20,631 over the previous year.

The subordinate inspecting staff of 9 inspectors and 20 sub-inspectors remained unchanged ; but 10 additional sub-inspectors were employed temporarily.

Of a total of 5,615 unprotected infants registered in towns where vaccination was compulsory, 54% were successfully vaccinated. The success rates in these towns varied between 8% and 99%.

Burma.

82. The staff comprised 38 district superintendents, 98 part-time supervising officers, 30 inspectors of vaccination and 352 vaccinators. Temporary staff was, as usual, employed to deal with epidemics.

1,253,886 vaccination operations were performed as compared with 1,140,152 in 1932-33, the increase being attributable to the effect of health propaganda work and the introduction of compulsory revaccination in a wider area. The number of operations recorded during the year is the highest in the history of the province in spite of the fact that smallpox was less prevalent.

Of the total of 1,001,449 operations in rural areas 572,098 were primary and 429,351 revaccinations. Of the primary operations, 508,944 were successful, and 141,805 were amongst infants under 1 year of age and 286,339 amongst children between 1 and 6 years. Of the revaccinations only 98,547 or 32% were successful.

In urban areas, excluding cantonments, 251,550 operations (61,598 primary and 189,952 revaccinations) were performed. Of the primary cases 56,894 or over 97% of the verified cases were successful ; 38,969 amongst these were amongst infants under 1 year of age and 14,115 amongst children between 1 and 6 years. Infantile successful vaccinations were 5,395 in excess of the estimated number of surviving infants. Of the revaccinations, 45,250 or 30% of the verified cases were successful.

A total of 156,895 operations (682 primary and 156,213 revaccinations) were performed at the ports of Rangoon and Akyab on immigrants by sea ; he results of these operations could not, of course, be verified.

Baluchistan.

83. Eleven vaccinators performed 52,560 vaccinations as against 52,540 in the previous year.

Andamans.

84. Vaccinations numbered 3,735 (127 primary, 47 secondary and 3,561 revaccinations), of which only 776 were successful.

Vaccination amongst troops.

85. Particulars regarding vaccination in the army will be found in Table B of the Appendix to this section (page 353).

Compulsory Vaccination.

86. Table VI (*iii*) gives the number of towns in which the Vaccination Act was in force.

TABLE VI (*iii*).

	Municipal towns and Notified areas.	Vaccination Act in force in		Municipal towns and Notified areas.	Vaccination Act in force in
British India . .	**947**	**785**	C. P. . .	118	83
N.-W. F. P. . .	13	10	Bombay .	114	33
Punjab . . .	249	214	Madras . .	82	82
Delhi . . .	3	2	Coorg . .	2	2
U. P. . . .	85	85	Assam . .	25	23
B. & O. . . .	59	59	Burma . .	74	74
Bengal . . .	118	118	Ajmer-Merwara	5	..

In the Punjab, out of the 29 districts in the province, the Vaccination Amendment Act of 1929 has been extended to 19 districts completely and to 7 partially. In Madras Presidency vaccination was compulsory throughout the Presidency except in few areas.

B.—Indian States.

87. *Punjab States.*—Statistics of those Indian States which maintain their own establishments are given in Table VI (*iv*).

TABLE VI (*iv*).

	Vaccinations.		Success-rate.	
	P.	R.	P.	R.
Patiala	62,659	45,626	99·3	75·5
Kapurthala	9,110	6,131	97·6	53·9
Faridkot	6,088	1,219	98·6	44·8
Jind	11,076	..	99·3	..
Bahawalpur	23,248	1,095	99·9	80·2
Nabha	7,305	208	95·6	51·4

Bombay Presidency States.—A total of 127,715 primary vaccinations and 25,573 revaccinations were performed. The success rate was 97% for primary cases and 76% for revaccinations. The average cost per successful case was Re. 0-6-9.

Burma States.—The staff comprised 2 district superintendents of vaccination, 1 part-time supervising officer, 1 inspector of vaccination and 46 vaccinators. Vaccinations performed in these States numbered 106,706 (70,834 primary and 35,872 revaccinations). Of these 60,740 primary and 17,331 revaccinations were successful. The average cost per successful case was Re. 0-8-0.

Mysore State.—Vaccination operations amounted to 251,629 (176,123 primary and 75,506 revaccinations), each vaccinator averaging 1,553 operations. The success rate for primary cases was 83% and for revaccinations 23%. In Bangalore city, 3 cases of complications were reported, one of ulceration, one of cellulitis and one of eruptions.

These cases were in children between 1 to 5 years and all occurred in the second week after vaccination.

The cost per successful case was Re. 0-6-5.

As in previous years, lanoline lymph was used and the lymph was experimentally tested for potency in the model range where 875 vaccinations were done with a success rate of 98%. Of the 306,608 cases for which lymph was issued, the results of 135,486 primary cases were reported with a success rate of 92%.

SECTION VII.

PUBLIC HEALTH WORKS.

A.—British India.

General.

88. The financial stringency of recent years has acted as a severe brake to progress in environmental hygiene and during 1933 there was little evidence of any relaxation of that brake. The figures given in the succeeding paragraphs of this section indicate that incomes of local bodies still continue to shrink, but it is worthy of note that the proportions of these incomes devoted to public health amenities in most cases have decreased to an even greater extent. The remarks made in last year's report, therefore, are equally applicable to existing conditions, although perhaps to the optimistic observer there is a faint hope that the worst is over and that from now onwards local Governments and local bodies will be able to devote larger sums to public health works. The severe retrenchments made in public health budgets during the last four years make it all the more necessary to initiate new advances whenever money becomes available and public health officers—both administrative and executive—ought to take early and vigorous steps to ensure that the budgets with which they are concerned contain adequate provision for these advances. But even now there is abundant scope for improvement. When one notes that in certain provinces and districts only 2—3 % of the total income is spent on water supplies, conservancy and drainage, it is easy to realise how serious must be the environmental health conditions of the people living in those areas. In an earlier part of this report comment has been made on the detrimental effect which a low standard of environmental hygiene has on infant life and, so long as this factor is neglected, so long will that enormous loss of life be inevitable, no matter what other attempts are made to reduce it. Every health officer in India must be aware of the importance of an improved sanitary environment and in light of that knowledge should seize every opportunity to press upon his Council, Board or Government the urgent necessity for a larger expenditure towards that end. If it be true that public opinion is demanding a higher standard of life, one of the most effective methods of meeting that demand is the improvement of the home and its surroundings. It is the duty of every public health worker to do his utmost to effect that improvement and it is the duty of every local body to provide the necessary funds.

During 1932-33, the municipalities in British India, out of a total income of 16 crores of rupees, devoted approximately 3·98 crores or 25 % to public health. Whilst this percentage of total income remains the same as in 1932, it is to be noted that the total income has fallen by one crore so that there has been actually a large decrease in the sums spent on the primary necessities of public health.

Water supplies cost Rs. 1,25,95,322, conservancy Rs. 1,48,96,135 and drainage Rs. 38,43,275, these totals all being considerably less than those for the previous year. The percentage expenditure on public health varied between 46·4% in Bengal and 13·1 % in Delhi. The remark made in last year's report that neither municipal councils nor local boards have

given sufficient attention or money to public health applies with even greater force than before.

Table VII(*i*) gives for each province total municipal figures for income and expenditure on public health during the year 1932-33. It also gives the amounts devoted to conservancy, water supplies and drainage, respectively, in each province during that year. In reading the narrative paragraphs dealing with individual provinces, therefore, the figures in this table should be referred to.

Table VII(*i*).—Provincial expenditure in Municipalities.

	Income.	Expenditure on P. H.	Expenditure on P. H. per cent. of income.	Expenditure on—		
				Conservancy.	Water supply.	Drainage.
	Rs.	Rs.		Rs.	Rs.	Rs.
British India	**16,07,26,671**	**3,98,47,657**	**24·8**	**1,48,96,135**	**1,25,95,322**	**38,43,275**
N.-W. F. P.*	23,60,703	4,73,769	20·1	2,29,206	95,192	39,302
Punjab	1,60,71,907	38,78,078	24·1	14,43,050	12,53,795	6,28,640
Delhi*	57,32,710	7,53,604	13·1	2,92,476	2,05,907	70,876
U. P.	1,98,43,286	55,73,146	28·1	25,09,137	17,94,257	7,02,747
B. & O.	50,36,524	17,58,410	34·9	10,81,526	3,44,021	2,12,820
Bengal	1,12,98,248	52,38,742	46·4	22,64,196	14,60,058	7,09,310
C. P.	85,65,549	24,48,913	28·6	11,69,957	7,52,232	2,15,231
Bombay	4,10,99,397	69,23,641	16·8	29,68,551	21,78,508	8,34,688
Madras	2,34,50,477	64,53,000	27·9	‡	32,19,000†	..
Assam*	12,05,055	5,35,925	44·5	2,89,746	1,42,022	34,785
Burma	2,63,62,815	58,10,429	22·0	26,48,290	11,50,330	3,94,876

* Figures are for the year 1933.
† Includes expenditure on drainage.
‡ Not available.

North-West Frontier Province.

89. Total expenditure on public health measures in municipal towns and notified areas rose slightly as compared with the previous year.

District boards had a total income including opening balances, of Rs. 21,86,608 but only Rs. 73,199 was devoted to public health. Of this completely inadequate proportion, Rs. 7,850 was spent on water supplies, Rs. 3,680 on conservancy establishment and Rs. 2,106 on drainage and sewage.

Government grants-in-aid to municipalities and notified area committees amounted to Rs. 16,057, including Rs. 7,000 for a water supply scheme for Kulachi notified area, Rs. 6,739 for sanitary purposes in Peshawar, and Rs. 1,600 for sanitary improvements in Tank notified area. Similar grants to local bodies for water supplies and other public health purposes amounted to Rs. 25,440, including Rs. 15,000 for 6 wells in the dry areas of Teri tehsil and Rs. 3,200 for piped water supplies to certain villages in Hazara district.

Sanitary inspections of the towns were made by the Director and Additional Assistant Director of Public Health. Defects in urban drainage and conservancy systems were brought to notice and practical suggestions suitable to local conditions and commensurate with financial conditions were made.

Punjab.

90. Total expenditure on public health measures amounted to Rs. 38,78,078, an amount which indicates that the retrenchments made in recent years were still in force. In the 114 small towns, total income, excluding opening balances, and total expenditure on public health measures both showed a further large contraction, the figures being Rs. 8,97,803 and Rs. 2,74,789, respectively. Income derived from the sale of sullage and manure in 9 municipal towns amounted to Rs. 1,78,150.

The sanitary engineering department has under construction 36 public health projects, 8 on behalf of the Government and 28 on behalf of the local bodies. 15 preliminary and 21 detailed projects estimated to cost Rs. 16,13,740 and Rs. 18,35,097, respectively, were prepared by the engineers of the public health division. The most important of these were sanitary works in Mandi town of Pir Mahal in Lyallpur district (Rs. 1,13,340), Sakesar water supply (Rs. 34,000), Bhiwani drainage scheme (Rs. 4,62,440), Thal Ilaqa water supply (Rs. 53,042), Kamoki Mandi drainage scheme (Rs. 40,470), Phullerwan drainage extensions (Rs. 82,126), Dera Ghazi Khan drainage scheme (Rs. 10,38,850), Sakhi Sarwar water supply (Rs. 92,019) and Jullundur drainage extensions (Rs. 69,660).

Piped water supplies are now available in 42 towns. Water flushed latrines and urinals are becoming more popular in the larger towns.

Village Sanitation.—The health staff had standing orders to organise improved sanitation in all the villages they visited. The results attained naturally varied considerably, but the organised campaign had an effect which on the whole was by no means negligible, although continued effort is essential if there is to be anything in the nature of permanent improvement. In order to give some idea of what such a campaign means, a few items are worth mentioning. In Ambala circle alone, 2,616 villages were sanitarily improved, 60,333 rubbish heaps were removed outside the village *abadis*;

47,404 manure pits were excavated ; 118,128 feet of *pucca* drains were constructed ; and paving of lanes with bricks was carried out in a large number of villages. 120 cesspits were constructed and 1,027 cowdung stores and 136 *chamar kunds* were removed outside the village *abadis* in Ambala circle alone. The provision of house ventilators was a regular feature of the sanitary programme, a total of 20,183 being constructed. Most important of all, 1,114 local sanitary sub-committees were formed with the object of encouraging self-help in the villages concerned. In regard to the improvement of village water supplies, 457 well parapets were constructed, 191 wells were repaired, 31,157 wells were cleaned and 88 hand pumps were installed, a sum of Rs. 55,943 having been spent on these amenities. In addition, a number of new wells and hand pumps were constructed by private individuals at their own cost.

Sanitary Board (April, 1933, to March, 1934).—The Board held two meetings during the year, but owing to financial stringency its activities were of necessity handicapped. A sum of Rs. 2,50,430 was placed at its disposal for grants-in-aid to local bodies (Rs. 1,75,430 for urban works and Rs. 75,000 for the improvement of rural water supplies). Out of this sum Rs. 1,34,910 were spent on urban and Rs. 66,663 on rural works. The grants included Rs. 64,383 for Bhiwani water supply scheme, Rs. 13,500 for Montgomery drainage scheme, Rs. 41,513 for Leh pollution prevention scheme and Rs. 51,965 for Thal Ilaqa water supply extension scheme. The board continued to tender advice in regard to important questions on public health policy and gave administrative approval to schemes placed before it.

Delhi Province.

91. Total municipal expenditure on public health showed a further decrease, the sums allotted to conservancy, water supplies and drainage being all considerably less than those of the previous year. District public health expenditure was only Rs. 14,214 or 5·14 % of the total income.

The Joint Water Board was responsible for the supply of filtered water to the urban areas of New Delhi, Delhi city, Notified area, civil lines, Fort Delhi and Delhi Cantonment. The water works scheme for the Shahdara Notified area was completed but has not proved satisfactory. No municipal supply exists in other areas and water has to be drawn from shallow wells. The sewage farm at Kilokri is meant to deal with sewage from New Delhi, Delhi city, Notified area, civil lines and Fort but the farm is heavily overloaded and the question of a new disposal system is now under examination. Notified areas located in rural areas have no underground drainage and, although some have a few *pucca* surface drains, few have been provided with a proper outfall and as a result waste water and sewage are permitted to lie in surface pools where the drains end.

Whilst rural water supplies are almost entirely obtained from shallow wells, in the riverine tracts and in the canal zones these sources are used at least for domestic purposes. The average village has, however, no drainage system and even where attempts are made to provide *kutcha* drains, these are seldom kept in good condition and the lanes and paths are soaked in sewage.

Large sums will have to be provided for water supply and drainage schemes before this province, in which the Imperial Capital is situated, can be brought to a satisfactory public health standard.

United Provinces.

92. The total income of municipalities was much the same as in the previous year. Expenditure on health works executed under the Superintending Engineer, Public Health Department, amounted to Rs. 25,11,483, a further decrease of Rs. 1·1 lakhs. Of this total, Rs. 2,81,928 were spent on original water works and special repairs, Rs. 16,52,757 on water works' maintenance, Rs. 3,39,105 on drainage and Rs. 2,37,693 on other works, whilst Rs. 3,99,207 was spent on constructional works. Projects to the value of Rs. 7,01,229 were finally sanctioned ; others to the value of Rs. 47,23,919 were submitted but not sanctioned ; projects estimated at Rs. 19,41,063 were under preparation. 32 schemes were delayed for want of staff.

Water supplies.—An acute water shortage existed during the hot weather in all the large towns in the plains and in some instances complaints of shortage continued even during the winter months. The public became concerned and in one town a group of rate-payers petitioned the board asking for a refund of water tax as they considered that the minimum quantity of water they were entitled to was not forthcoming. The cantonment and railway authorities in some towns were also dissatisfied with the limited supplies provided and are making arrangements either to supplement the municipal supply or to procure an independent supply.

Board of Public Health.—The board, which met thrice during the year, had at its disposal Rs. 1,71,681. The amounts spent included (*a*) pilgrim centres (Rs. 32,430), (*b*) urban sanitation (Rs. 79,209), (*c*) rural and minor sanitary works (Rs. 34,052) and (*d*) other works (Rs. 25,990). The grant for pilgrim centres included Rs. 13,549 for the cost of an additional tube well with pumping plant in connection with the Hardwar water supply extension; Rs. 12,000 for the production of cinema films for use at fairs and Rs. 2,797 for sanitary arrangements at Piran Kaliar fair. From the sum set apart for urban sanitation, Rs. 18,300 were spent on the Dehra Dun water supply scheme, Rs. 18,566 on the Budaun municipality drainage scheme, Rs. 13,000 towards the Gorakhpur drainage scheme, Rs. 11,180 in connection with Bareilly anti-malarial works, Rs. 10,000 for Unao municipality drainage scheme and Rs. 5,000 for the construction of a water reservoir in Jhansi. The amount meant for rural sanitation and minor sanitary works was expended on small drainage schemes, construction of sanitary wells and repairs to existing wells. The amount of Rs. 25,990 under other works was spent on the Dewa Fair water supply scheme.

The total income of district boards was Rs. 1,93,26,832 and total expenditure on public health Rs. 5,38,490, a ludicrously inadequate proportion.

Bihar and Orissa.

93. Total expenditure on public health in the 58 municipalities amounted to Rs. 17,58,410, another decrease of 2·6 lakhs, although the percentage rose slightly to 35 %. Expenditure on markets and fairs absorbed Rs. 42,019.

District boards spent Rs. 5,13,903 or only about 3 % of their total income on public health. Expenditure on conservancy totalled Rs. 2,74,754 ; on water supplies Rs. 1,45,610 and on drainage Rs. 4,059 ; Rs. 9,360 were also spent for markets and fairs. These figures, like others already given, indicate the very small part which public health plays in the activities of the district boards.

Bengal Presidency.

94. Expenditure on public health totalled Rs. 52,38,742, Rs. 6 lakhs less than in 1931-32, but still 46·4 % of the total income.

Sanitary Board, Bengal.—The board held 6 meetings during the year and 8 water works schemes estimated to cost nearly Rs. 9 lakhs in all were considered. The total capital expenditure on water works and sewerage works was Rs. 6,13,721. Sketch projects for schemes estimated to cost Rs. 25,78,699 were prepared; detailed projects costing Rs. 9,15,800 and detailed estimates and plans for miscellaneous works amounting to Rs. 1,95,897 were also prepared.

It is gratifying to find that, although the stoppage of Government grants naturally checked the undertaking of sanitary engineering schemes, several municipalities decided to finance their schemes by means of loans; this accounted for the large increase in the value of the projects prepared during the year. As usual, the board was frequently called upon to give its advice and assistance.

Central Provinces.

95. A total of Rs. 24,48,913 or nearly 29 % of municipal revenues was spent on public health. Markets and slaughter houses absorbed Rs. 1,23,080. During 1933-34, government sanitary grants to municipalities and other local bodies amounted to Rs. 45,603, this sum including Rs. 30,000 for infant welfare work, Rs. 13,210 to cover half the pay of health officers and sanitary inspectors, Rs. 1,261 to cover half the pay of midwives and Rs. 872 for carrying out anti-malarial measures in Pachmarhi town. Grants aggregating Rs. 16,594 were paid to 7 municipalities to meet 50 % of the cost of the campaign against rats. In general, reasonable activity was displayed in connection with the sanitation of towns and attempts were made to carry out improvements, but few important sanitary betterments were possible owing to financial stringency.

Improvement of rural water supplies.—No grants were made for this purpose.

Village sanitation.—The aggregate income of the 79 villages under the Village Sanitation and Public Management Act amounted to Rs. 2,20,062, whilst total expenditure amounted to Rs. 2,07,915 including Rs. 3,031 for water supply, Rs. 38,814 for cleaning of village sites, and Rs. 3,444 for drainage. Total receipts of town fund and other villages under the *Mukaddam* rules aggregated Rs. 21,523 and the expenditure of Rs. 21,302 included Rs. 599 spent on water supply; Rs. 9,659 on cleaning of village sites and Rs. 123 on drainage. In the *ryotwari* villages of 8 districts Rs. 5,553 was spent on the improvement of water supplies. 197 new *panchayats* were established and 4 abolished, the total number at the end of the year being 796.

Board of Public Health.—No regular meetings were held, papers being circulated to members.

Bombay Presidency.

96. Expenditure on public health measures per head of population was about Rs. 3-9 in Karachi city, the average figure in the other municipalities being Rs. 2-5. Complete sanitary surveys of 18 towns were made and 58

towns were inspected or reported upon and action was taken by many of the municipalities on the suggestions made by the inspecting A. Ds. P. H.

The municipal water supplies of the larger towns were all regularly sterilised and maintained their standard of purity. Improvements to drainage works were carried out in 7 towns during the year.

Government distributed grants amounting to Rs. 1 lakh for the improvement of village water supplies. These grants, supplemented by allotments from local funds and private contributions were expended on constructing wells, tanks, troughs and cisterns, in repairing old wells and in boring operations. 532 draw wells were constructed and 139 step wells converted into draw wells.

The aggregate income of the 27 district local boards and 222 taluka local boards totalled Rs. 1,83,96,135 and expenditure on public health works amounted to Rs. 7,72,214 or a little more than 4 %.

Committees.—Many of the 548 sanitary committees and village *panchayats* carried out useful work ; one village sanitary board interested itself particularly in conservancy.

Board of Public Health Works.—Two meetings of the board were held ; ordinary papers were circulated to the members. The board accorded approval to the preparation of the following projects : (i) Mehad water supply, (ii) improvements to Barsi water supply, (iii) Barsi drainage, (iv) improvements to Pandharpur water supply, (v) water purification works at Pandharpur, (vi) Nandurbar drainage, 4th stage, and (vii) Jejuri water supply.

Madras Presidency.

97. *Water supplies.*—Two new municipal water supply works at Proddatur and at Tadpatri were completed during the year, bringing the total number of towns with protected water supplies up to 39. Water supply works were in progress in 5 municipalities and improvements to existing water supplies were being executed in 8 other towns.

No new rural schemes came into operation, but two were under execution and a third was sanctioned. Plans and estimates were under preparation or investigation for 3 further centres.

Drainage.—No new major scheme came into operation, but the sewage works in Bezwada and Salem were continued. Plans and estimates for sewage schemes were under preparation for 6 large towns. Investigations were completed for 3 towns and drainage schemes for 9 more towns were being investigated.

Assam.

98. Expenditure for public health purposes increased from 40 % of total income in 1932 to 44 % during 1933. Epidemic charges, including upkeep of contagious and infectious diseases hospitals, decreased to Rs. 6,123.

The percentage of expenditure on public health to total income in municipalities and small towns varied between 57 % to 26 %. The 19 local boards in the province spent Rs. 1,74,557 on public health measures including Rs. 94,584 on water supplies. Expenditure on drainage amounted only to Rs. 129 and on control of epidemics to Rs. 23,207 ; no money was spent on conservancy.

Burma.

99. Of the total municipal income, over 22 % was spent on public health purposes, the largest expenditure being Rs. 36,42,452, or nearly 63 % of the total, in Pegu division. About Rs. 7·4 lakhs were devoted to markets and slaughter houses. Epidemic charges increased to Rs. 34,543 during 1932-33.

Water supplies.—The reconstruction of Akyab water supply was still in progress. The remaining part of the incomplete Magwe scheme was carried out during the year with the help of a Government loan. The Mawlaik town committee pursued its scheme by providing 6 additional wells ; financial stringency caused the abandonment of the piped water supply. In Moulmein, where the tube well supply has failed to give a satisfactory supply, an investigation was carried out by the Superintending Engineer, Public Health Circle. In Pyapon 19 additional pumps were installed. The Yandoon water supply scheme was completed during the year at a total cost of Rs. 24,759.

Conservancy.—Pyu municipality started a departmental system of conservancy. In Maymyo the double bucket system of night-soil removal was put into operation and in Maubin this system was restored. A night conservancy system was started in Kyonpyaw. At Thongwa, where the water-logged condition of the ground during the monsoon makes it impossible to carry out any system of trenching, proposals were made for the construction of a dumping tank and the disposal of night-soil into the creek at ebb tide.

Rural sanitary works.—In rural areas, out of an aggregate income including opening balances of Rs. 1,04,14,417, the sum of Rs. 7,92,967 was expended on public health works. This total included Rs. 2,14,580 on conservancy, Rs. 22,576 on water supplies, and Rs. 405 on drainage. Epidemic and vaccination charges amounted to Rs. 23,747 and Rs. 2,90,063, respectively ; markets and slaughter houses cost Rs. 1,48,751. Owing to financial stringency little if any advance was made in improving the unsatisfactory water supplies which obtain in most rural areas.

Public Health Board.—Owing to severe restriction of expenditure, the functions of the Board remained for all practical purposes in abeyance. The allotment was limited to the amounts necessary to provide for commitments already made, these including Rs. 11,906 for the Magwe water supply scheme, Rs. 700 to Bhamo and Rs. 134 to Kyaukpyu for anti-malarial measures.

B.—Indian States.

Mysore State.

100. During the year 6 new water works were installed, bringing the total up to 36 piped water supplies serving a population of 703,991 ; 4 existing water supplies were improved and their capacities enlarged. New designs and estimates were prepared for 27 water supply systems, 12 from bore-wells, 6 from infiltration wells, 4 from an impounded reservoir and 5 from rivers ; designs and estimates were prepared for improvements and extensions to 7 existing water supply systems. 1,627 samples of drinking water supplies were examined.

Plans and estimates were prepared for improvement of 3 drainage systems ; designs and estimates were prepared for 6 sewage systems and for improvements to 17 existing sanitary works. Drainage schemes for 2 towns were approved by Government.

Surveys were undertaken in 24 towns in connection with town improvements ; 12 towns were surveyed with a view to sanitary improvements.

The Mysore city municipality continued to utilise night-soil and street rubbish for the preparation of a manurial compost ; sales of this compost brought in a revenue of Rs. 10,375 during the year.

Federated Shan States (Burma).

101. The total income, including opening balances, was Rs. 29,04,993 ; Rs. 2,63,601 in towns and Rs. 26,41,392 in rural areas. A total of Rs. 1,46,610 was spent on public health measures, Rs. 77,928 in towns and Rs. 68,682 in urban areas. Expenditure on water supplies amounted to Rs. 19,626 for urban areas and Rs. 3,102 for rural ; that on conservancy to Rs. 34,286 and Rs. 23,046, respectively, and on drainage to Rs. 6,166 and Rs. 33,863. A sum of Rs. 12,376 was spent on markets and slaughter houses in urban areas.

SECTION VIII.

LABORATORIES AND MEDICAL RESEARCH.

Central Research Institute,* Kasauli.

102. Lt.-Col. J. Taylor, I.M.S., was Director throughout the year. Other I. M. S. officers who served on the staff were Majors Maitra, Craighead and Greval and Capt. Ahuja. Researches under the auspices of the I. R. F. A. included (*a*) helminths by Dr. V. T. Korke ; (*b*) bionomics and early stages of phlebotomus by Dr. I. M. Puri ; and (*c*) protozoological survey by Dr. J. C. Ray.

With funds provided by the I. R. F. A. the institute was almost entirely reconstructed during the year in order to provide increased accommodation and a more convenient lay-out for the departments concerned with manufacture of vaccines, for the institute staff and for associated research enquiries.

The Director attended meetings of the central committee of the Pasteur Institute of India, of the S. A. B. and G. B. of the I. R. F. A. and the 11th Conference of Medical Research Workers. He continued to act as Editor of the I. J. M. R. and Indian Medical Research Memoirs, 2 numbers (Nos. 26 and 27) of the latter being published.

Two medical officers were given instruction in bacteriological and laboratory technique ; the helminthologist of the Imperial Institute of Veterinary Research, Muktesar, was given facilities for the study of the trematodes in the helminthological collection at the institute and Dr. Naidu of the Haffkine Institute worked on the concentration of serum in association with the institute staff.

The main products manufactured were anti-typhoid and anti-cholera vaccines and anti-venom serum (anti-venine) for civil and military requirements in India. All vaccines required for military purposes in India (except anti-plague vaccine) are made at the institute and the same products are also supplied to those provinces which are not in a position to manufacture them locally. The institute is the only source of supply of anti-venom serum for both civil and military use. Other vaccines and certain biological products such as high titre sera were issued as required.

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* Annual Report of the Central Research Institute, Kasauli, including the Annual Report of the Malaria Survey of India for 1933, Manager of Publications, Delhi. Price Rs. 3-10-0 or 6*s*. 3*d*.

Abbreviations—

I. R. F. A. . . .	Indian Research Fund Association.
S. A. B.	Scientific Advisory Board of the Indian Research Fund Association.
G. B.	Governing Body of the Indian Research Fund Association.
I. J. M. R. . . .	Indian Journal of Medical Research.
I. M. G.	Indian Medical Gazette.
D. T. M. . . .	Diploma of Tropical Medicine.

Table VIII (*i*) gives the quantities in c.cs. of vaccines and sera issued in 1932 and 1933 :—

TABLE VIII (*i*).

	1933.	1932.
Vaccines.		
Prophylactic cholera	462,002	409,170
Prophylactic T. A. B..	350,920	320,660
Prophylactic influenza	20,072	14,462
Curative	8,731 doses.	9,729 doses.
Autogenous	800 doses.	510 doses.
Sera.		
Anti-venom	173,680	151,720
Normal horse	14,300	14,520
High titre	718	873

Bulk stocks of vaccines were maintained to meet both ordinary requirements and emergent demands, these being regularly turned over to ensure freshness. The properties of the vaccines prepared have been the subject of continuous study and further information has been obtained as to the suitability of the strains used, the immunising value of the vaccines and their keeping properties. A series of tests have been made of the prophylactic cholera vaccine stored for periods up to 6 months in the Punjab and animal protection tests have shown that the vaccine kept for such a period gives full protection as compared with 100 per cent. mortality in controls under the conditions of the experiment. The practice of using 2 strains of *B. typhosus* for the T. A. B. vaccine was continued, the typhoid element being represented by (*a*) Rawling's strain and (*b*) a freshly isolated strain in equal proportions. Special methods of preparation and preservation used in the manufacture of the T. A. B. vaccine have enabled the strain to retain a high proportion of smooth elements and the characteristic 'H' and 'O' antigens. Animal protection tests have suggested that the institute strain gives effective protection against infection with fresh smooth strains. Further work has shown that the strain has a high polysaccharide content which is probably an important factor in immunisation and an indication of general smooth character. A statistical analysis of the results of inoculation has indicated that satisfactory protection against *B. typhosus* infection is obtained by its use, but as 2 *typhosus* elements are present, it is not possible to assign the value of the vaccine to either the Rawling's strain or the freshly isolated strain.

Certain improvements were made in the preparation of influenza vaccine and a new medium for the production of pneumococcus growth in bulk was introduced with satisfactory results.

524 specimens of pathological material were examined, including 105 Wassermanns, 63 agglutination tests for typhoid, paratyphoid, malta fever, etc. ; 85 Rideal-Walker tests ; and 84 autogenous vaccines were prepared. Tests of the toxicity of samples of novarsenobillon were also carried out for the Medical Stores in India. A collection of type cultures of organisms consisting both of standard strains obtained from the National Collection of type cultures and Indian strains was maintained. The supply of culture media, strains, reagents and agglutinable emulsions for diagnostic purposes was continued.

A complete bibliography of work done on cholera carriers in India was prepared and reports on the incidence of yaws in India were collected. The institute library constitutes the central reference library for all medical research workers in India ; a consolidated catalogue for it and for other large institutes in India was completed.

Research work.—Progress with research work was hampered to some extent as the institute was under reconstruction until September, 1933, and new researches had to be restricted. A list of 8 papers published in the I. J. M. R. is given in Appendix V (page 356). The succeeding paragraphs, extracted from the Director's report, indicate the variety of problems dealt with.

(*a*) *Studies on Vibrios.*—An extensive series of investigations has been carried out on vibrios isolated from cholera cases, their variants and vibrios obtained from water, with the object of determining their relationships. This work has been done with vibrios of known origin and history and the findings have been correlated with the protein and carbohydrate structure of individual strains as determined by Dr. Linton.

(*i*) *The significance of differences in the chemical structure of smooth cholera vibrios.*—It was found that smooth cholera strains which differed in possessing respectively a galactose and an arabinose fraction showed identical serological reactions and when used as vaccines for immunization of animals against infection with the opposite type strain, reciprocal full protection was obtained. Prior to determination of this point the finding of these chemical differences in vibrios might have suggested the advisability of using both types in the prophylactic vaccine but it would appear that there is no necessity for this.

(*ii*) *Immunization with rough variants of V. Cholerœ.*—Rough variants obtained from smooth cholera strains of known chemical structure were used for protection experiments in the same way and were found to give a partial protection only, which was probably non-specific as the degree of protection was of the same order as that given by a *B. typhosus* vaccine. These strains were inagglutinable. Similar tests were made with a rough El Tor strain agglutinable with standard high titre cholera serum (so far as could be determined on account of instability in saline, alcoholic suspensions giving positive 'O' agglutination). This strain gave 100 % protection against smooth cholera strain infection.

Dr. Linton has determined that, while most rough variants have a very low carbohydrate content, this rough El Tor showed a content equal to that of smooth strain. The results suggest the importance of the carbohydrate fraction and its possible relationship to serological reactions.

(*iii*) *Relationship of rough variants of V. Cholerœ.*—A series of rough variants obtained either as naturally occurring variants of known smooth strains or derived experimentally by 'phage by other laboratories and also rough strains isolated direct from cholera cases were used for preparation of special high titre sera in order to determine their antigenic relationships. Absorption and cross agglutination tests were carried out and in the case of 20 such tests serological relationship was shown only in two instances. The results so far obtained have not indicated the lines on which variation proceeds in the case of *V. Cholerœ* and this subject will require to be further investigated. Cross protection experiments with heterologous rough strains have also given negative results showing the absence of antigenic relationship of these variants.

(*iv*) *Serological relationships of the Busserah strains.*—This group of 4 strains which has been the subject of study in laboratories in Europe and elsewhere was especially investigated. The strains are 'phage contaminated and while in our hands have shown continuous variations in their serological reactions.

(*v*) *Study of water vibrios.*—Several strains of vibrios have been isolated from water but those so far examined have not shown serological relationship with each other. Smooth strains have not been found to give protection against infection with smooth cholera strains, although they give full protection with a homologous strain. No serological relationship has been found between the water vibrios and the Busserah strains showing the same chemical fraction.

One of these strains has been found by Linton to show the chemical fractions he had previously found only in vibrios isolated from water in Bengal and as its history shows that it was originally derived from a cholera case it would appear probable that a chemical change has occurred during the process of variation.

(*b*) *Studies on Cholera Vaccine.* (*i*) *The value of single dose inoculation.*—This was the subject of reference by the Office International d'Hygiene Publique and, in addition to reporting on the question in the light of the results of examination of statistical evidence, an experimental study was made in animals. A number of guinea pigs were given single doses of the standard cholera vaccine made at the Institute and subsequently submitted to intraperitoneal infection at different intervals. It was shown that no protection was given by the 5th day, partial protection only at the 7th day and full protection by the 10th day. This finding was in conformity with evidence from other sources that immunization takes 8 to 10 days to be effective.

(*ii*) *Keeping properties of cholera vaccine.*—Vaccine which has been stored in the Punjab up to six months from the date of manufacture, including a period of the hot weather in the plains, was found to show full immunizing value equal to that of vaccine one month old,—full protection being given by both in animals against 100 per cent. mortality in controls. It would appear that the expiry period of this vaccine might be extended. Work will be continued on the further keeping properties of the vaccine.

(*c*) *Trials of cholera diagnostic high titre sera.*—Two sera prepared by Dr. Cantacuzene in connection with the work of the Cholera Commission of the Office International d'Hygiene Publique were submitted to critical comparative tests on a series of vibrios of different types from different parts of India and of carefully determined character. The sera were found to be suitable for the diagnosis of smooth strains derived from cholera cases but thier chief value was in regard to determining the 'O' antigen of typical strains.

(*d*) *Susceptibility of Indian bred white mice to the toxic action of novarsenobillon.*—The work on this subject reported last year was continued. The standard preparation of neo-arsphenamine supplied by the Medical Research Council was used in graded doses for testing the susceptibility of a large series of white mice in successive batches. It was found that the standard test dose of 0·43 mg. per gramme of body weight for 14 gramme mice was excessive for the mice of the Institute's herd bred in India, and the results indicated the necessity of fixing a lower dosage. The detailed figures of the tests were submitted for statistical analysis and on the results of this analysis the suitable dose has been fixed at 0·3 mg. per gramme of body weight.

(*e*) *The value of stock organisms used for the preparation of T. A. B. Vaccine.*—The study of the Rawling's strain of *B. typhosus* for the preparation of anti-typhoid vaccine was completed during the year. Protective value of other components of the vaccine, *e.g.*, *B. paratyphosus* A (Mears) and *B. paratyphosus* B (Rowland) was investigated and the results were published in the *Ind. Jour. Med. Res.*, 21, 1, July, 1933.

(*f*) *The use of white mice for standardization of Antivenene.*—Comparative tests for estimation of the titre of the serum against cobra venom have recently been carried out using pigeons and white mice as experimental animals. The indications so far are that white mice can be used as the test animals but the results are not so regular as in pigeons. Further work is in progress.

(*g*) *Viability of bacterial cultures.*—A number of stock laboratory cultures were tested for viability after having been kept in sealed tubes at room temperature for periods ranging from 12 to 19 years. The majority of the strains of organisms of the salmonella and dysentery groups was found to be living and a *B. typhosus* strain was still alive at the end of 19 years. A few cultures of *P. avisepticus*, *B. pneumoniæ* (Friedlander) and *B. proteus* X 19 were also tested and found to be alive after 12 to 13 years. *Haemolytic streptococci* and *Staphylococcus albus* retained viability for 11 to 12 years.

The medium used for preservation of the salmonella and dysentery strains was mutton digest agar, and for streptococci, staphylococci and avisepticus 10% pigeon blood agar.

(*h*) *Immunization of horses with formalized venoms.*—The use of venoms detoxicated by the action of formalin for immunization of animals for the production of antivenom serum has been largely practised by Grasset at the South African Institute for Medical Research. This method has been under trial at the Institute during the year and it would appear that it may be of value. Comparative studies of untreated and detoxicated venoms are being continued.

(*i*) *Concentration of Antivenene.*—The work done on this problem at the Institute during the previous year was continued. Satisfactory concentration has been obtained by means of a revised ammonium sulphate method consisting of the removal of euglobulin at 18% saturation, followed by separation of pseudoglobulin at 28% saturation subsequent pressing and final dialysis. This method gave consistent and regular results and has now been taken into use for large scale issue of the concentrated serum. The earlier work of concentration had been carried out with serum but for practical purposes concentration from plasma has now been employed. As the yield of serum from blood has averaged 40 to 45% while a yield of 60% is obtained from plasma the total yield of concentrated serum represents a very considerable increase in unitage. Detailed studies have been carried out on the protective fractions of the serum, keeping properties, etc.

All-India Institute of Hygiene and Public Health, Calcutta.

103. In the report for 1932 an account of the opening of the All-India Institute of Hygiene by His Excellency the Governor of Bengal was given. The appointment of the staff of the Institute however was delayed by the financial crisis of 1931. The Government of India decided that financial stringency would not allow them to allot the sum of Rs. 3½ lakhs to the upkeep of the Institute as they had originally intended. A sum of Rs. 2 lakhs was made available, with the assurance that the original sum of Rs. 3½ lakhs would be allotted as soon as financial conditions allowed. For this reason it was decided that only 4 of the 6 sections would be opened, *viz.*, Public Health Administration, Vital Statistics and Epidemiology, Malariology and Nutrition and Biochemistry. The sections of Maternity and Child Welfare and of Sanitary Engineering were left in abeyance. Realising the importance of having education in maternity and child welfare work available for post-graduates in India, the Committee of the Countess of Dufferin's Fund decided to bear the cost of starting this section and put at the disposal of the Institute the services of Dr. Jean M. Orkney, W.M.S. Dr. Orkney joined the staff of the Institute on the 15th April, 1932, and proceeded first to make a careful survey in Calcutta

and the surrounding areas of conditions pertaining to maternity child and welfare. This survey enabled her to outline schemes of work for Calcutta and also for the Jute Mills in and around Calcutta. A model maternity and child welfare clinic has also been started in connection with the institute. This has received support from Calcutta Health Week and the Corporation of Calcutta give grants for milk. As a result of these surveys and considerations, a course for a diploma in maternity and child welfare was drafted and finally agreed on, and the Faculty of Tropical Medicine of Bengal decided to grant a diploma in these subjects. Three lady graduates joined the course in 1933 and two completed the course and obtained the diploma.

The diploma of public health of Calcutta University is open only to graduates. As it was felt that there were probably many medical men in responsible health appointments, but not graduates, who would be able to profit by the diploma course of the Institute and to whom the possession of a diploma would be helpful, it was accordingly decided with the sanction of the Governments of India and Bengal to accept selected candidates not otherwise eligible for the D. P. H. of a University for the diploma course and to grant them after examination a diploma in public health from the Faculty of Tropical Medicine of Bengal. Such candidates are carefully selected and must fulfil certain conditions before admission.

The question of appointing the professorial staff of the Institute was considered by the Government of India early in 1933 and the conditions of appointment finally approved of in March. Advertisements were issued both in India and abroad and the Appointment Board of the Governing Body of the Indian Research Fund Association was instructed to make selections. This Board was assisted by a Consultative Committee in England who interviewed and reported on candidates who had applied in the United Kingdom. Final selections were made in October and the following appointments were agreed to by the Government of India :—(*a*) Professor of Biochemistry and Nutrition—Dr. H. Ellis C. Wilson ; (*b*) Assistant Professor of Biochemistry and Nutrition—Dr. B. Ahmed ; (*c*) Professor of Vital Statistics and Epidemiology—Dr. R. B. Lal ; (*d*) Assistant Professor of Vital Statistics and Epidemiology—Dr. K. C. K. E. Raja ; (*e*) Professor of Malariology and Rural Hygiene—Dr. K. V. Krishnan ; and (*f*) Assistant Professor of Malariology and Rural Hygiene—Dr. Banamali Ghosh.

These gentlemen however did not join their appointments until 1934. Courses for the Diploma of Public Health however were based on the Institute during 1933 and the lectures, etc., given by Lt.-Col. A. D. Stewart, the Director and Professor of Public Health Administration. Col. Stewart attended the May session of the Office International d'Hygiene Publique at Paris as delegate of the Government of India. At this session the subject of cholera and cholera carriers occupied an important place in the discussions and it was agreed that there were many problems concerning cholera which could only be carried on in India where cholera is endemic. The President of the Permanent Committee of the Office International addressed the Government of India on the subject. The matter was again discussed at the meeting of the Conference of Medical Research Workers at Calcutta in November, 1933. As a result of these discussions the S. A. B. of the I. R. F. A. appointed a Cholera Advisory Committee to recommend the lines on which investigations should be directed. As a result of their recommendations, an investigation in cholera based on the Institute, in which the staff of the Institute and School of Tropical Medicine and the Central Research Institute co-operate, was formed. The object of this investigation is to study the subject of the endemicity of cholera

in certain areas of Bengal, to account for this endemicity if possible and especially to study the cholera vibrio in such an endemic area, in cases, contacts and healthy persons and to link up if possible, the activities and connections between the various types of vibrios found. This enquiry was started in 1934.

During 1933 the Institute housed various enquiries and researches. Dr. Linton continued his work on the structure and nature of the cholera vibrio. The kala-azar enquiry under Dr. Smith continued its researches into the nature of the transmission of kala-azar and the bionomics of the Phlebotomus sandfly. The research side of the leprosy enquiry of the I. R. F. A. under Dr. Muir worked in the Institute. Dr. Ukil conducted research into the epidemiology and pathology of tuberculosis in India and Bengal. Details of these researches are given in the chapter on Researches under the I. R. F. A. (page 213). The Public Health Department of the Government of Bengal conducted an important enquiry into the prevalence of *A. Ludlowi* in the vicinity of Calcutta. This enquiry was housed in the Institute.

During 1933 therefore the Institute made its start though the staff did not actually join till 1934.

School of Tropical Medicine, Calcutta.*

104. Lt.-Col. H. W. Acton, C.I.E., I.M.S., was Director up to 7th April, Lt.-Col. R. N. Chopra, C.I.E., I.M.S., from 8th April to 21st November and Lt.-Col. R. Knowles, I.M.S., for the rest of the year.

The School and the Carmichael Hospital for Tropical Diseases, which is primarily a research hospital attached to the School are of the status of a provincial institution under the Government of Bengal, but actually both have an all-India aspect. The provincial government contributed Rs. 2,80,838 towards the maintenance of the School and Rs. 1,28,051 for the Hospital, whilst the Endowment Fund of the School provided Rs. 1,63,488 and the I. R. F. A. Rs. 64,336 to meet the cost of 2 Professors of Pathology and Protozoology and Rs. 1,44,493 for 11 different researches carried on in the School on kala-azar, leprosy, skin diseases, malaria transmission, indigenous drugs, drug addiction, etc. The Indian Tea, the Jute Mills and the Mining Associations continued to help in obtaining funds and advising with regard to investments.

In addition to the main departments, the various special research departments were engaged on respiratory diseases under Dr. Napier; leprosy under Dr. Muir; hookworm under Dr. Maplestone; bowel diseases under Captain Pasricha; filariasis under Dr. S. Rao, etc. The enquiry on kala-azar was closed and a new enquiry was begun in connection with the problems of anaemia and respiratory diseases, especially pneumonia, in the Assam tea gardens.

Close co-operation continued to be maintained between the School and the All-India Institute of Hygiene and Public Health. Whilst Dr. Muir's out-patient clinic and laboratory were still in the School, his research laboratory was transferred to the All-India Institute of Public Health. Of the 38 post-graduate students who appeared for the D. T. M. examination, 33 passed,

* Annual Report of the Calcutta School of Tropical Medicine and the Carmichael Hospital for Tropical Diseases, 1933. Bengal Government Press, Alipore, 1934 (*Gratis*).
The Calcutta School of Tropical Medicine, 1920—33. An Essay—Review by Lt.-Col. R. Knowles, I.M.S., being a supplement to the Annual Report of the School for 1933. Bengal Government Press, Alipore, 1934 (*Gratis*).

one being awarded the Chuni Lal Bose Medal. 24 students attended the D. P. H. course; 23 appeared and passed Part I in May and 20 passed Part II in September. 37 students attended the L. T. M. course; of the 39, including old students, who appeared, 22 passed the examination.

The Carmichael Hospital for Tropical Diseases, providing 92 beds and 14 cabins, continued to function as a distributing centre, selecting suitable cases for teaching and research work and sending them to the different departments concerned, where their suitability for admission to the hospital is further considered. It is doubtful if any other medical institution in the tropics can supply such a wealth of clinical material for teaching and research work.

The 1,066 cases treated included dysentery 190, malaria 128, skin diseases 108, kala-azar 76, black water fever 6, dermal leishmaniasis 18, splenomegaly 35, diabetes 35, general anaemias 20, asthma 49, influenza 23, dengue 8, gastro-duodenal ulcer 21, enteric fever 12, asthenic diarrhœa 11, hookworm 47, filariasis 42, other helminthic infections 22, epidemic dropsy 5 and others 210.

A brief resumé of the more important research activities of the different departments of the School is contained in the following sub-paragraphs:—

(*a*) The department of tropical medicine continued to investigate spleen and liver diseases. Two notable events were the extended use of atebrin in malaria and the introduction of carbasone in the treatment of chronic amoebiasis. Two papers entitled "Some observations on 2 cases of disorders of the liver in infancy and childhood" and "Therapeutics for the diseases of the liver" were published in the I.M.G. and Indian Medical Record, respectively, whilst a paper on "Therapeutics for the diseases of the spleen" was read and discussed at the Calcutta branch of the British Medical Association in September. It was reported that the Mexican type of infantile cirrhosis of the liver is not the same as the Indian type. The Mexican type of case shows leucopaenia instead of leucocytosis which is a feature of the Indian type. Though the clinical picture and pathological findings noticed by observers in these 2 widely separated tracts resemble one another, yet they are not identical diseases. The sections of the liver in the former type showed cavities with creamy whitish fluid without cellular elements. The Mexican type is seen not only in children of tender age but in adults also and a persistent diarrhœa is more marked and symptoms referable to the nervous system are more frequent and pronounced.

(*b*) The department of bacteriology, pathology and helminthology had a well equipped bacteriological section, where the routine work included bacteriological examinations of the stools of every case admitted to the hospital, the serological investigation of selected cases, the preparation of vaccines and other miscellaneous examinations, *e.g.*, protein sensitiveness tests, Von Pirquet's reaction, etc. Work on the variants of the cholera vibrio under the influence of and the basic study of bacteriophage was also carried on; that on the antigenic relationship of different types of vibrios was commenced. The grant given by the I. R. F. A. enabled work to be done in connection with toxin formation by cholera and cholera-like vibrios. The pathological section worked on the pathology of intestinal diseases. Vibrio strains were examined for roughness or smoothness, the nitroso-indol reaction haemolytic properties, lysability by choleraphage and agglutinability by standard cholera high titre. Rough strains of vibrios were found to appear generally after the 5th day of the disease and the frequency of rough strains was most marked towards the end of the epidemic; non-agglutinable strains appeared on the 6th

day of illness and their frequency was noticeable as the epidemic subsided. The vibrio strains that failed to give the nitroso-indol reaction fermented salicin in addition to the usual "sugars" fermented by vibrios but were in all other respects typical vibrios. On the other hand the strains that fermented salicin also gave a very definite nitroso-indol reaction.

The examination of cases for haemolysis of human red-blood-cells showed varying results; tests for lysability showed that none of the non-agglutinating vibrios were lysable by choleraphage type A, but a large number of the non-agglutinating vibrios were lysable by mixed choleraphage. Of the strains examined for agglutination with cholera high titre sera 73 % were agglutinable—64 % well agglutinable and 9 % partially agglutinable—and 27 % were non-agglutinable by any of the specific cholera sera.

The relative frequency of excretion of the types of vibrio occurring in cholera stools on different days of the disease and during different stages of the epidemics was worked out. Some of the results obtained are very interesting and valuable in establishing the aetiological relationship to cholera of the so-called cholera-like non-agglutinating vibrios which may preferably be called atypical cholera vibrios.

Other important research work carried out included the study of *Bact. pseudocarolinus*.

(*c*) In the protozoology department, under Dr. B. M. Das Gupta, the work has been of a very varied character. The problem of monkey malaria has been studied throughout the year and it is now possible to give a standard description of *Plasmodium knowlesi* Sinton and Mulligan, 1932. It has been shown experimentally that small doses of quinine when given intramuscularly are more readily absorbed and of greater therapeutic efficiency than large doses, as the latter cause local necrosis and this interferes with absorption of the quinine. Results with atebrin are very remarkable and much better than with quinine but in every instance in monkeys relapses occurred, which however were extremely amenable to treatment. It has been shown experimentally that monkeys can acquire tolerance to monkey malaria just as man does to human malaria. The malaria transmission enquiry was continued throughout the year; a very interesting finding was that of nuclear division occurring in malarial sporozoites. Apparently the "sporozoite" is *not* the end phase of the sporogony cycle of the malaria parasite.

(*d*) The serological and immunological departments, in addition to Wassermann, blood grouping and complement fixation tests for clinical purposes, continued the examination of serum protein fraction variations, more particularly to evaluate the degree of accuracy of the refractometric method of serum protein analysis and the influence of certain physical conditions, such as alteration of PH value, dilution and "inactivation", upon the quantitative values of the fractions in question. The results obtained showed clearly: (*i*) that the form of the serum protein fraction graphs in cases of kala-azar under treatment is affected to a minor degree only by changes in the physical conditions of the serum, and that therefore the previously reported claim that a serological basis of treatment for kala-azar has been introduced remains valid; and (*ii*) that after PH adjustment of the serum the refractometric method yields values for the protein fractions practically identical with those yielded by the Kjeldahl process, thus rendering it possible to employ with confidence the physical method of analysis as an adjunct to clinical work and dispense with the more tedious Kjeldahl process.

With a view to obtaining more precise information as to the feeding habits of certain anopheline mosquitoes, an important enquiry on the identification of the blood meal of these mosquitoes by means of specific precipitin antisera was being carried out.

(*e*) In the pharmacological department, work on the snake venoms was continued and the pharmacological action of the venom of the Indian Daboia, *Vipera russeli*, was completed. Daboia venom, unlike cobra venom, was found to act chiefly on the circulatory system. The symptoms of daboia poisoning resembled those of histamine shock. The pharmacological action of *Echis carinata*, another common variety of poisonous snake occurring in certain parts of India was being worked out and the physico-chemical changes produced by different snake venoms in the blood of animals were being investigated. The study of the physical properties of the blood serum in health and disease showed that the pathological sera indicated generally a high viscosity, low surface tension and diminished buffer action.

In view of the importance of anti-malaria remedies recently introduced, pharmacological, chemotherapeutic and clinical investigations were carried out with such drugs as atebrin, plasmochin, malarcan, tebetren, etc. Some remedies synthesised in India were also investigated.

The efficacy of carbasone in the treatment of chronic amoebiasis was studied and was found to give a cure rate of nearly 82% of the cases treated.

Investigations in connection with indigenous drugs and drug habits in India were continued. The drugs examined included *Holarrhena anti-dysenterica*, *Rauwolfia serpentina*, *Thevetia neriifolia* and *Cucumis sativus*. Of these the most interesting was that on the value of *R. serpentina*, an indigenous remedy much used in the treatment of insanity, epilepsy, and high blood pressure. On analysis, alkaloids were isolated which have a profound effect on the central nervous system, the cerebral centres being depressed in the reverse order to their development. The drug may prove a valuable sedative but it has a depressant action on the respiratory centre, it lowers blood pressure and usually causes purgation.

Other interesting studies have been on a glucoside from *Thevetia neriifolia*, which has a digitalis-like effect and on the erepsin ferment of the cucumber which acts best in a slightly acid environment.

The drug addiction enquiry was continued. In regard to the opium habit in India, in some areas the incidence of this habit was found to be as high as 4 to 5% of the population, but taken as a whole, it has steadily declined of recent years. The doping of infants continues, however, and the morphia habit seems to be spreading, the drug not being used for its narcotic effects, as in Europe, but for its euphoric and aphrodisiac effects. Hemp addicts are numerous in India and constitute 1 to 2% of the population in some areas. Enquiries at the Ranchi Indian Mental Hospital showed that 35 % of the inmates were drug addicts and a close relationship in India between drug addiction, insanity and crime seems to exist.

The incidence and effects of alcoholic beverages in India were also studied. Most of these were found to have a low alcoholic content and a highly nutritive value, being rich in vitamins. In areas where these beers are drunk, there is a marked absence of vitamin deficiency disease.

(*f*) The entomological section was engaged chiefly on investigations into the role played by the annelids in medicine ; myiasis, rat fleas, hymenoptera, annelida, hemiptera and coleoptera. Other subjects studied were mosquito

and malaria; stegomyia and dengue. It was found that *A. philippinensis* can be readily infected experimentally with malaria in the cold weather; whilst *A. rossi* which has been the subject of controversy for many years was under investigation. Trials were made of anti-malaria drugs as "sporozoiticides" to see whether they would prevent infection of man by the mosquito. Plasmoquine, quinine and the cinchona alkaloids all proved useless; with atebrin 2 out of 3 volunteers became infected.

(*g*) In the hygiene section, work on food standards and on certain problems of sewage and faecal organisms was continued.

(*h*) The special research departments financed by the Endowment Fund continued their work on anaemias and respiratory diseases in the tea gardens; hookworm; leprosy; bowel diseases; diabetes; and filariasis.

Anaemias and respiratory diseases.—This enquiry was undertaken in order to ascertain the extent of prevalence of anaemia in the Assam tea gardens; its relative incidence in the different classes of the population; its association with known causes, *e.g.*, malaria and hookworm disease. A preliminary enquiry into the prevailing pneumococcal types causing pneumonia in Assam was also carried out.

Hookworm.—The toxicity of hexyl-resorcinol was tested on cats. Although not unpleasant to take, it was found to cause some damage to the mucosa of the stomach but could be safely given to alcoholics and it removed some 50 per cent. of tapeworms at a single treatment. Carbon tetrachlorethylene, which was retested for its toxicity, was found much less toxic than carbon tetrachloride and to possess great advantages over the latter drug in the treatment of hookworm infections. It can be given safely to alcoholics and a combination of carbon tetrachlorethylene with chenopodium oil appeared to be the ideal treatment for hookworm infection. Creeping infection due to hookworm larvae was found to be much milder in India than in countries like U. S. A. Other subjects dealt with included an improved technique for cultivating hookworm larvae.

Leprosy.—Pathological study showed that even in slight cases leprosy is often more widespread throughout the body than appears at first sight; leprosy is essentially a disease of the reticulo-endothelial system; in nerve leprosy, the nerve lesions and macules show a granulomatous change with numerous giant cells and bacilli though few can usually be detected even by careful examination.

The results of a study of bacillaemia in leprosy were published in the I.M.G.

Repeated attempts to cultivate the bacteria of human and rat leprosy on artificial media were unsuccessful; all available evidence is against the existence of a filter-passing phase of the causative organism. A 5 per cent. solution of sodium hydnocarpate fails to kill *Mycobacterium leprae muris* in vitro and the action of the hydnocarpates in leprosy must be an indirect one. An improved method for staining *M. leprae* in sections of tissues was worked out. Trypan blue was found to be useful for subconjunctival injection in patients with ocular complications. The leprolin test was investigated and was found to be of value in determining the type of the disease present, in prognosis and in assessing the value of different treatments.

Leprosy surveys were carried out in Rajshahi, Nadia, Dacca, Howrah, among the Calcutta leper beggars, in the higher educational schools and in some industrial concerns. A rural investigation centre was opened at Bankura.

Bowel diseases.—These included studies of (*i*) the therapeutic value of bacteriophage in the treatment of cholera, the results being inconclusive or unreliable for want of proper control; (*ii*) the toxins of the cholera vibrios which failed to confirm Acton and Chopra's claim that toxic amines are produced by the vibrios in culture in veal broth.

(*i*) A brief summary of the results of this experiment is given below :—

TABLE VIII (*ii*).

	Treated with 'phage.	Not treated with 'phage.
Cases	290	180
Deaths	42	40
Case mortality per cent.	14·5	22·2

Table VIII (*iii*) summarises the bacteriological findings of the 2 series of cases.

TABLE VIII (*iii*).

	Treated with 'phage.		Not treated with 'phage.	
	No.	Deaths.	No.	Deaths.
Agglutinating vibrios isolated . . .	170	18	103	20
Non-agglutinating vibrios isolated . .	33	3	9	1
No vibrios isolated	87	21	68	19

Bacteriophage active against cholera and the dysentery and typhoid groups of organisms were prepared. Choleraphage types A, B and C either singly or in combination do not cause total destruction of the vibrios and failed to yield any definite serological variants, whereas the more recent types, particularly types F, G and H singly or in better combination with other types give marked serological variants. In addition to 10 types of choleraphage, this department has 20 different groups of 'phages active against non-agglutinating vibrios. In the preparation of choleraphage, the aim has always been to include most of the types of choleraphage. It has not been possible, however, to prepare a brew of choleraphage containing all the known types. Certain types appear to have a very definite antagonistic or inhibitory effect on other types.

Diabetes.—The main line of work during the year was the study of the differential value in sugar content between the capillary and the venous blood under varying conditions in normal and diabetic subjects and although the material available has not warranted any definite conclusion, it has led to several interesting findings.

Filariasis.—In addition to a survey of the Patna State in Orissa, several new drugs were tried in treatment.

The work of the Pasteur Institute has been dealt with on page 209 of this report.

For further details of the many activities of the School, the Director's annual report and a special report written by Col. Knowles and embodying a 13 years' review of the work accomplished by the staff should be consulted. 92 scientific papers were published by the School staff and workers (see page 356). In addition, 41 other papers were either in press or under preparation.

Haffkine Institute, Bombay.

105. Lt.-Col. S. S. Sokhey, M.A., B.Sc., Ch.B., M.D., D.T.M. and H., I.M.S., acted as Director throughout the year. Dr. S. N. Gore (1st January to 31st March), Major S. D. S. Greval, I.M.S. (1st January to 31st March), Dr. K. S. Mhaskar (1st April to 31st December) and Dr. P. M. Wagle (1st April to 31st December) were Assistant Directors. Dr. B. P. B. Naidu and Dr. M. B. Soparkar worked as special research workers.

The Institute continued to function as (*a*) the centre for the manufacture of plague vaccine for the whole of India, (*b*) the centre for the manufacture of antirabic vaccine for Bombay Presidency and treatment centre for Bombay city, (*c*) the provincial diagnostic laboratory for the Bombay Presidency and (*d*) the centre of medical research.

The period under review was one of great strain. Financial stringency led to the reduction of the senior staff of the Institute from six officers to three. This large reduction, for which the Institute was in no way prepared, coincided with a greatly increased demand for its products. The demand for plague vaccine alone rose from an average yearly demand of 13 lakhs to 21 lakhs of doses. Consequently the routine preparation of the various prophylactic vaccines and diagnostic work in bacteriology, pathology and biochemistry was carried out under great difficulties and new research work was greatly restricted.

Plague Vaccine.—A total of 1,582,182 doses was issued as compared with 1,361,978 in 1932. The largest monthly issue, 259,028 doses, was made in September and the lowest, 51,330, in June. British India took 1,049,567 doses and the Indian States 503,463 doses. Bombay Presidency alone was supplied with 597,946 doses.

Examination of rats.—736,940 rats from Bombay city were examined; of these 393 or 0·15 per cent. were found to be plague infected, 329 being identified as *Rattus norvegicus* and 64 as *Rattus rattus*. The peak of infection was reached in March and April and the minimum incidence from August to December.

Antirabic Section.—Details of the work in this section are given on page 210 of this report.

Diagnostic Section.—Bacteriological, serological, pathological and biochemical work for various hospitals in the Presidency was done; over 3,000 Wassermann tests were carried out.

Research Work.—(*a*) *Plague Vaccine.*—Besides the production of a greatly increased quantity of plague vaccine, important research work on plague vaccine was carried out during the year. Formerly the organisms from which the vaccine was made, though obtained from human cases, were passed through rats to maintain their virulence. Research work showed that cultures made from human cases if stored at 5°C. to 8°C., maintained their virulence undiminished for long periods. This permitted the use of human strains for the preparation of vaccine. Another point of departure has been the use of at least five different strains for the preparation of each batch of vaccine instead of a single colony of a single strain which was the prac ice heretofore. These are the two most important changes made in the preparation of the plague vaccine since Haffkine left the Institute. The result of these changes has been to make our vaccine 30 times more potent than before. The mouse protective dose as determined in 1931 was 0·06 c.c.; now it is 0·002 c.c.

(*b*) *Antiplague Serum.*—Up to the present no specific cure for plague is known. Experimental work on the preparation of a specific anti-serum against plague has been carried out and the epidemic at Poona during the year gave an opportunity to test the curative value of the serum prepared in actual human cases. Of the 167 cases treated in the usual way 143 died, giving a mortality of 85 per cent. while, of the 179 cases treated with the Institute serum 108 died giving a mortality of 60 per cent. These results are favourable, but further attempts to make the serum more potent are in progress. Work on the concentration of the serum and on devising methods for measuring its potency was also carried out. The expenses for this work amounting to over Rs. 60,000 were met by a grant from the I. R. F. A.

(*c*) *Epidemiology of Plague.*—Systematic investigation into the immunity of rats to plague in different places in India—especially Madras Presidency—where the disease has occurred in epidemic form has been continued during the year. This year's work further confirms the observation that rats from places which have suffered from plague are immune in proportion to the severity of the epidemic.

(*d*) *Pharmacological Unit.*—This department was closed down at the commencement of the financial year on account of financial stringency. It was a department of great value and the small expense incurred in running it was producing valuable scientific knowledge. For example, indigenous drugs were being studied and those proved useful could have been taken up by scientific medicine. It is hoped that the department will be restored at a very early date.

(*e*) *Tuberculosis Enquiry.*—(*i*) *Filterable phase of the Tubercle Bacillus.*—Dr. Soparkar continued his study of the biological characters of the bacilli isolated from animals inoculated in series with the filtrates of tuberculous tissues and sputum. While the original material used for filtration contained bacilli of the human and the bovine types, the bacilli isolated after filtration showed characters resembling the avian type. In some cases the strains obtained from earlier passage animals showed intermediate characters. A marked change in biological characters was thus observed after filtration.

(*ii*) *Transformation of the Tubercle Bacillus of one type into another.*—Evidence of transformation of human and bovine types into the avian type was obtained under certain other experimental conditions also.

(*iii*) *Tuberculous bacillaemia.*—In experimentally infected fowls bacillaemia was always found to be present and blood cultures gave positive results in every instance in which the bird had shown evidence of disease.

(*iv*) *Vernes' serum test for tuberculosis.*—Results of the test carried out on a large number of hospital patients suffering from conditions other than tuberculosis showed that the test is not specific for tuberculosis.

Work was also continued on (*a*) spontaneous tuberculosis in laboratory animals, (*b*) surgical tuberculosis amongst young children in India and (*c*) dissociation of the tubercle bacillus.

King Institute of Preventive Medicine, Madras.

106. Lt.-Col. H. H. King was Director of the Institute except for a short period from 20th April to 7th July, when Dr. C. G. Pandit and Major W. J. Webster, I. M. S., acted in succession.

Vaccine lymph.—Only glycerinated lymph is issued ; details of its manufacture will be found in Section VI of this report.

Bacterial Vaccines.—Issues included 389,875 stock doses of cholera, 24,220 of T. A. B. and 1,220 of influenza vaccines. Other issues included 7,818 stock doses and 465 autogenous doses of staphylococcus pyogenes; 8,242 and 368 of streptococcus; 1,745 and 302 of mixed staphylococcus and streptococcus; 1,180 stock doses of *B. typhosus* (curative); 1,179 and 18 of pneumococcus and 1,008 stock doses compound catarrhal vaccines. The total issue of cholera bacteriophage was 497,700 c. cs. The remarks of the Director regarding the efficacy of bacteriophage are given below :—

> "The evaluation of bacteriophage is a most difficult matter. The indications seem to be that given sufficiently early to a case of cholera either soon after the case starts or given prophylactically before the symptoms begin, the chances of recovery are increased and further the chances of infecting others are decreased, because the cholera vibrios tend to disappear from the stools of cases who have received cholera bacteriophage."

Bacteriological, serological and chemical examinations.—A total of 48,036 examinations was carried out; these included microscopical and bacteriological 8,670, serological 33,489, chemical 348, water samples 5,225 and others 304. The practice of doing only a Kahn test on all ordinary specimens but doing a Wassermann test as well when the Kahn test is positive was continued.

Research work.—Some of this work is summarised below but for details the original report and the 10 papers published in the I. J. M. R. and the I. M. G. should be consulted. (See page 356.)

(*a*) *Vaccine lymph.*—Lymph was treated with clove oil 4 days before issue.

Comparable results in this connection are given in Table VIII (*iv*).

TABLE VIII (*iv*).

	Rates per cent. 1932-33.	Insertion success. 1930-31.
The Nilgiris	96·4	96·9
Malabar	95·8	97·2
South Kanara	96·9	97·9
Chittoor	94·7	98·0
Madras	95·6	98·6

The reduction in the bacterial count is shown by the following results. Out of 12 cups examined, 11 were found to be sterile and only 1 showed a count of 100 organisms per c. mm. as against 15,700 in the untreated sample under the same period and conditions of storage.

With the increase in potency in the vaccine lymph, attempts were made to produce dried lymph with encouraging results; the buffalo-calf lymph was found to withstand drying much better than ox-calf lymph. These experiments were being continued.

The original Nijland's seed cycle was to pass the seed from ox-calves to rabbits and from rabbits to buffalo-calves, the buffalo lymph being the seed used in the large scale production of lymph from ox-calves. During 1932-33, the cycle was modified by introducing another buffalo in the series with good results. An attempt was also made to eliminate the rabbit entirely from the cycle substituting in its place lymph obtained from a vesicle from a successfully vaccinated case.

In the experiments on the cultivation of vaccine virus by a tissue culture technique, 2 methods were followed—(*i*) cultivation on the allantoid

membrane of the developing chick egg and (*ii*) cultivation in flasks in the presenee of embryonic chick tissue. Both methods gave successful results using only virus from the calf and not from the rabbit.

(*b*) *Cholera bacteriophage.*—In its preparation Asheshov's methods were followed. To the 'phage seed supplied by Dr. Asheshov, which was a passaged (passed through a cholera patient) mixture of 'phage types A, B and C, were added the laboratory bred 'phages D, E-1 (Pasricha's E type) and E-2 (Morison's E type). More recently, the seed has been entirely a passaged seed of types A to E-1. The 'phage seed is grown on a culture of a selected recently isolated strain which has had very few sub-cultures. Asheshov's finding that vibrio strains differ in their capacity to yield good brews of 'phage was confirmed. The 'phage produced contains not less than 109 'phage corpuscles per c. c. and brings about complete lysis within 2 hours when a drop is added to a suspension of a 24 hours culture of vibrios.

Pasteur Institute of India, Kasauli.

107. Lt.-Col. H. E. Shortt, I.M.S., was the Director up to 21st March 1934 and Major G. C. Maitra for the rest of the year.

A total of 19,524 patients sought treatment at Kasauli and its centres and 15,938 underwent the complete course. Of 2,709 treated at Kasauli, 2,136 males and 491 females were Asiatics and 68 males and 14 females were Europeans. At the centres 13,229 cases were treated. Of these 10,152 males, and 1,803 females were Asiatics and 824 males and 450 females were Europeans. 59 cases left the institute and 1,995 left the centres before completing treatment and 1,446 were advised that treatment was unnecessary. Twenty deaths occurred amongst Asiatics treated at Kasauli and 63 amongst Asiatics treated at the centres; no deaths were recorded amongst Europeans. The death rate at Kasauli was 0·8% and that at the centres 0·5%. The total death rate for all cases was 0·6%.

Of the 2,709 cases treated at Kasauli, the biting animal was proved to be rabid in 109 cases ; was certified to be rabid in 51 and was probably rabid in 2,226 (17 deaths). The history of the animal was unknown in 286 cases (3 deaths) and the animal was probably not rabid in 37 cases. The figures for the centres under these categories were—proved rabid, 595 cases (1 death) ; certified rabid, 818 cases ; animal probably rabid, 8,893 cases (54 deaths) ; history of animal unknown, 2,780 cases (7 deaths) ; animal probably not rabid, 143 cases (1 death).

Table VIII (*v*) gives the death rates amongst Asiatics treated at Kasauli and its centres according to position of wounds.

TABLE VIII (*v*).

Position of wounds.	Kasauli.			Centres.		
	Treated.	Deaths.	Rate. %	Treated.	Deaths.	Rate. %
Leg	1,388	2	0·1	7,187	18	0·2
Trunk	75	..	..	364	..	..
Arm	698	2	0·3	4,259	16	0·5
Multiple	264	2	0·8	805	13	1·7
Face	148	5	3·6	333	10	3·3
Multiple face	136	9	6·8	265	6	2·5
Unknown	..	..	..	16	..	..

Of the 2,627 Asiatics treated at the institute, 1,585 had deep bites with 20 deaths (1·6 %) and 1,042 had superficial bites; the figures for the centres were 4,809 deep bites with 43 deaths and 7,146 superficial bites with 20 deaths.

Table VIII (*vi*) gives figures arranged according to lateness of arrival expressed in days for Asiatics treated at the institute and its centres :—

TABLE VIII (*vi*).

	Kasauli.			Centres.		
	Treated.	Deaths.	Rate. %	Treated.	Deaths.	Rate. %
1—7 days	2,273	13	0·6	10,535	47	0·4
8—14 days	282	5	1·8	1,576	5	0·3
15—21 days	64	1	1·6	527	5	0·9
22—28 days	25	..	..	168	2	1·2
Over 28 days	65	1	1·6	423	4	0·9

The total included 2,298 cases with 13 deaths at the institute and 11,254 cases with 46 deaths at the centres in which the biting animal was a dog; a jackal in 314 cases with 6 deaths and 1,513 cases with 15 deaths, respectively; a human being in 18 cases and 139 cases with one death; a donkey in 5 and 24, a horse in 4 and 60; a monkey in 11 and 42; a cat in 11 and 31; a cow, calf, bullock and ox in 22 and 57; a buffalo in 11 and 42.

Carbolised 5% Paris sheep vaccine was used both at the institute and its centres. Cases of classes II, III and IV were given 14 daily injections for 14 days; those of class I were given 7 daily injections for 7 days.

The scheme of dosage and duration of treatment were as follows :—

Class IV.—adults—*face* : 10 c. c. daily for 14 days.
Extremity : 7 c. c. daily for 14 days.

Class IV.—Children—*face* : 7 c. c. daily for 14 days.
Extremity : 5 c. c. daily for 14 days.

Class III.—Adults—5 c. c. daily for 14 days. Children 3·5 c. c. daily for 14 days.

Details of the work of the various Pasteur Institutes mentioned will be found in the following publications :—

(1) Pasteur Institute of India, Kasauli—33rd Annual Report of the Central Committee of the Association and the Report of the Director of the Institute for 1933.

(2) Pasteur Institute of Southern India, Coonoor—The Annual Report of the Director for 1933 together with the 27th Annual Report of the Central Committee of the Association for 1933-34. Methodist Publishing House, Madras.

(3) King Edward VII Memorial Pasteur Institute and Medical Research Institute, Shillong.—The 17th Annual Report for 1933. Assam Government Press, Shillong (Rs. 1-4 per copy).

(4) Report on the working of the Burma Pasteur Institute and Bacteriological Laboratory for 1933 and for 1933-34 respectively.—Superintendent, Government Printing and Stationery, Burma.

(5) Pasteur Institute, Calcutta, 10th Annual Report of the Pasteur Institute, Calcutta, for 1933, Bengal Secretariat Book Depôt, Calcutta.

Classes I and II cases received 2 c. c. daily for 7 and 14 days respectively. Three out of every 4 cases of class IV treated at Kasauli were, in addition to the ordinary vaccine treatment, given anti-rabic serum with encouraging results and it was proposed to extend this method of treatment as soon as a sufficient supply of the serum became available.

Complaints attributed to treatment were received from 109 patients but as usual most of these bore no causal relationship to the treatment. Five cases of paralysis following treatment were recorded.

The brains of 337 animals were examined and 222 were found positive for rabies.

Research work.—This included experiments on (*a*) the post-infectional immunising value of immune serum as an adjunct to vaccine treatment and when used alone ; (*b*) the post-infectional value of various chemical agents in preventing rabies ; (*c*) the neutralising action, if any, of anti-rabic serum on fresh rabies fixed virus ; (*d*) the duration of immunity in immunised animals ; (*e*) the preparation of an improved vaccine for the treatment of animals ; (*f*) the photo-dynamic action of methylene blue on rabies fixed virus ; (*g*) the conservation of street virus at a low temperature ; (*h*) the keeping properties of carbolised 5% vaccine ; (*i*) morphological and serological studies on rabies ; (*j*) the value to human cases of immune serum when given in conjunction with routine vaccine treatment ; (*k*) development and morphology of *B. canis* in the tick *R. sanguineus* ; (*l*) behaviour of *S. cruzi* in the Indian species of *Triatoma., viz., T. rubrofasciata* ; and (*m*) development of Deucocytozoa in mites and other blood sucking arthopods.

Four scientific papers were published in the I. J. M. R. ; these should be consulted for further details (see page 356.)

Pasteur Institute of Southern India, Coonoor.

108. Major K. R. K. Iyengar, I.M.S., was Director throughout the year.

Institute.—417 patients (18 Europeans and 399 Asiatics) underwent complete treatment ; 46 were incompletely treated and 199 were given advice without treatment. For the first time in the history of the institute, no death occurred during the year. The total included 13 cases of class I, 86 of class II, 262 of class III and 56 of class IV. In 13 cases, the biting animal was proved to be rabid ; in 5 it was certified so ; in 275 it was probably so ; in 110 the history of the animal was unknown ; and in 14 the animal was probably not rabid.

Class I.—Cases not bitten but licked on fresh cuts or abrasions.

Class II.—Superficial but not extensive bites on the trunk and extremities excluding the fingers.

Class III.—Superficial bites on the fingers. Superficial extensive bites, on all parts of the body except the head and neck, and deep but not extensive on all parts of the body except the head and neck.

Class IV.—Deep and extensive bites on all parts of the body and all bites and scratches on the head and neck.

Semple's carbolised 5% sheep vaccine was used throughout. The dosage and duration of treatment are given in Table VIII (*vii*) :—

TABLE VIII (*vii*).

Class.	Adults.	Children.	No. of days.
I	2 c.c.	2 c.c.	7
II	2 c.c.	2 c.c.	14
III	5 c.c.	3·5 c.c.	14
IV A	7 c.c.	5 c.c.	14
IV B	10 c.c.	7 c.c.	14

One case of very severe local reaction during treatment was noted at the institute.

The dog was the biting animal in 375 cases ; cat 26 ; monkey 4 ; jackal, panther and fox 2 each ; wild cat, horse and donkey 1 each ; and in 3 cases the biting animal was unknown. Of the 298 brains examined, 215 were positive, 60 inconclusive and the rest were either negative or unfit for examination.

A total of 831,325 c.cs. of anti-rabic vaccine was manufactured. Issues to veterinary surgeons amounted to 22,550 c. cs., although only 335, animals were said to have been treated. 44 medical officers were given training in anti-rabic treatment.

Of the 298 specimens examined, 215 proved positive.

Local centres.—For classes III and IV the same treatment as that at the institute, was given. For classes I and II, up to the 9th March, 1933, 2% vaccine was given in 5 c.c. doses for 7 and 14 days, respectively and thereafter 5% vaccine in 2. c. c. doses for 7 and 14 days respectively. The amount of brain matter injected was therefore the same. 10,447 courses of anti-rabic vaccine were issued to these centres, although only 9,056 (263 Europeans and 8,793 Indians), 6,978 of classes III and IV and 2,078 of classes I and II, were said to have completed treatment. The health of the patients was ascertained in 8,658 cases. Of the 9,056 completely treated cases, 33 Asiatics died,—31 of classes III and IV and 2 of class II. 19 occurred among those who completed treatment, giving a death rate of 0·2% ; 14 within and 5 after 15 days of the completion of treatment ; the failure rate was 0·6%. One death occurred from jackal bite, 1 from leopard bite, 1 from fox bite and the remaining 30 from dog bites. The shortest incubation period was twelve days (dog bite, class III) and the longest 74 days (fox bite, class III). Of the 14 deaths among the incompletely treated, giving a mortality rate of 0·7%, 9 developed hydrophobia during treatment and 5 cases occurred among those who absconded during treatment. In the case of 263 cases with 2 deaths, the biting animal was proved to be rabid ; in 174 cases with 1 death it was certified to be rabid ; in 7,349 cases with 27 deaths it was probably rabid ; 70 were probably not rabid ; whilst in 1,200 cases no particulars were available.

The biting animal was a dog in 8,611 cases ; a jackal in 186 ; man, 56 ; monkey, 43 ; fox and cow, 42 each ; cat 25 ; goat and rat, 16 each ; pig 5 ; leopard 3 ; horse, sheep and bear, 2 each ; buffalo and mongoose 1 each ; whilst in the case of 2 the animal was not known and in 1 case the infection was acquired in the laboratory. 561 cases with 2 deaths were under 4 years of age ; 1,598 with 8 deaths were aged 5—9 years ; 1,545 with 6 deaths between

10—14 years; 785 with 1 death between 15—19 years; 1,581 with 2 deaths between 20—29 years; 1,293 with 4 deaths between 30—39 years; 884 with 6 deaths between 40—49 years; 493 with 2 deaths between 50—59 years; 251 with 2 deaths between 60—69 years; and 65 non-fatal cases were 70 years and over. 5,415 cases with 7 deaths were bitten on the legs; 277 on the trunk; 2,647 with 12 deaths on the arm; 434 with 6 deaths multiple bites; and 283 with 8 deaths on the face. Among the 33 deaths 21 cases sought treatment 1—7 days after the bite; 4 cases after 8—14 days; 1 case 15—21 days; 4 cases 22—35 days; 1 case 43—49 days and 2 cases 50 days and over.

Research work.—Twelve scientific papers embodying the results of the different investigations carried out at the institute were published in the I. J. M. R.; a list is given in the Appendix to this Section (page 356).

King Edward VII Memorial Pasteur Institute, Shillong.

109. Lt.-Col. J. Morison, I.M.S., was Director of the institute except for the period from 28th May to 26th November when Dr. C. G. Pandit acted.

Anti-rabic treatment.—5% carbolised vaccine was used. A total of 1,305 patients (77 Europeans and 1,228 Indians) underwent the complete course; 110 were treated at Shillong and 1,195 at the 54 out-centres. Deaths numbered 6, all amongst Indians, who arrived for treatment within a week of being bitten. This total gives a death rate of 0·4%, the lowest recorded and a failure rate of 0·2%. Four deaths occurred from dog-bite and 2 from jackal-bite, the intervals between the bite and the death varying between 17 and 25 days. No death was reported amongst the cases treated in Shillong. No treatment was given to 157 cases and 84 received only partial treatment. One death occurred among children under 10 years of age and 5 among those aged between 20—49 years. Most of the European patients were only lick cases; 1,166 patients, or 89% of the total treated, were severe bites and all the deaths occurred in this group. In the case of 45 patients the biting animal was proved to be rabid; in 58 it was certified to be rabid; in 1,098 with 6 deaths it was probably rabid; in 92 the history of the animal was unknown; and in 12 cases the animal was not rabid according to the statements made by the patients. A dog was the biting animal in 1,124 cases; jackal, 143; cat, 18; cow, 9; human being, 8; monkey, horse and tiger 1 each.

A 2% carbolised vaccine was used up to 10th February and a 5% carbolised vaccine for the rest of the year. All lick cases (on fresh cuts or abrasions) of class I were given 2 c. c. daily for 14 days; classes II and III cases having superficial bites or scratches on body or limbs were given 4 c. c. daily for 14 days; class IV cases having deep and extensive bites on all parts and all bites and scratches on the head and neck were given 6 c. c. daily for 14 days. Of the 66 specimens examined for rabies, 36 were positive.

Vaccines.—448,884 doses of cholera, 10,846 c. cs. of T. A. B. and 13,400 c.cs. of influenza vaccine and 707,164 doses of bacteriophage were issued. 430,880 doses of bacteriophage were issued free by the provincial government in Nowgong and Habiganj; other issues included 150,500 doses to other government institutions, 74,736 to tea gardens, 2,528 to mission institutions, 4,688 to railways, 19,208 to other private institutions, 1,968 to municipalities, 14,016 to local boards and 8,640 to other governments.

Research Work—Bacteriophage.—The following extracts have been taken from the Director's report :—

" Research in cholera comes under four heads :—

1. The treatment of outbreaks by bacteriophage under village conditions.
2. The prevention of epidemic cholera by the distribution to villages of dysentery-cholera bacteriophage for the treatment of all cases of diarrhœa, dysentery and suspected cholera by the villagers themselves.
3. The carrier problem.
4. The changes effected on the cholera vibrio by the action of bacteriophage."

" 2,411 cases not receiving bacteriophage, many of which had the usual treatments, such as hypertonic saline and permanganate, permanganate alone or essential oils, atropine or calomel, had a mortality of 56·6%, while 1,032 unselected cases in the same population but treated with bacteriophage had a mortality of 22·6%. Among 482 unselected cases receiving bacteriophage on the first day of illness the mortality was 9·5% ; if treatment was delayed until the second day the mortality was 23·1%. Sir Leonard Rogers published a series of 1,003 cases treated in his wards in Calcutta with hypertonic saline and permanganate with a mortality of 25%. We have analysed 2,238 cases receiving no treatment or treatment other than bacteriophage and 912 cases receiving bacteriophage. We have divided these according to the treatment they had received, according to age, sex, caste and the period of the epidemic when they occurred, and have shown that the untreated, the groups receiving treatment other than bacteriophage, and the bacteriophage treated group were in these respects comparable and that there was no evidence of selection. In our latest figures 958 untreated cases in Silchar had a mortality of 77·9%, 532 cases receiving essential oils had a mortality of 37·6%, while 682 cases receiving bacteriophage had a mortality of 20·5%. Of particular interest is the effect of treatment on cases surviving the first two days, *i.e.*, on cases not dying from collapse in the early stages of the disease ; the mortality here is from uræmia, heart failure, pneumonia, sepsis and other secondary complications. They may be compared with those of Sir Leonard Roger's cases that did not die of collapse.

TABLE VIII (*viii*).

	Cases.	Deaths.	Mortality.
Calcutta—			
Saline and permanganate, 1st series . . .	659	103	15·6
Saline and permanganate, 2nd series . . .	91	14	15·3
Saline, permanganate and atropine	97	8	8·2
Assam—			
Phage on 1st day	482	46	9·5
Essential oils	400	95	23·7
Untreated	495	208	42·0

" In the recent Cachar epidemic bacteriophage was distributed within 6 days to over 300 villages in an area of about 350 square miles. Before the distribution of bacteriophage the mortality among 787 cases in Silchar was

57·7% and in Hailakandi for 224 cases it was 55·4%. When bacteriophage distribution began in Hailakandi, Silchar had 701 cases with 334 deaths, a mortality of 49·1% and Hailakandi had 711 cases with 170 deaths, a mortality of 23·9%."

"Since December 1929, an attempt has been made to prevent cholera epidemics by distributing cholera-dysentery bacteriophage to villages for the treatment of all diarrhœas, dysentery and suspected cholera. Nowgong, where this experiment was first tried, has had no outbreak for 4½ years; no other steps such as vaccination are being taken in this area. The average four-yearly mortality since 1906 to 1929 in Nowgong was 3,995 and in the period 1930 to 1933 there were 146 deaths. There is some ground for saying that during the last 4½ years at least 4,000 lives have been saved."

"Habiganj, another notorious area for cholera, was selected for experiment in July 1932. Bacteriophage was distributed first to about 1,500 villages, later to a total of 2,500, and the distribution has been maintained as in Nowgong by visits from the members of an epidemic unit." "In the 1927 epidemic vaccination was vigorously pushed and in 1933 vaccination was again vigorously pushed over the whole area except in Habiganj, where no vaccinations were done, but which was considered to be protected by the distribution of bacteriophage to all villages. The following table gives the deaths during these two epidemics in each sub-division between October and December when these epidemics occurred."

TABLE VIII (*ix*).

	1927.		1933.	
	Deaths.	Vaccinations.	Deaths.	Vaccinations.
Cachar	228	9,181	1,059	111,591
Karimganj	416	97,526	490	50,300
North Sylhet	875		873	27,100
South Sylhet	190		299	19,975
Sunamganj	1,443		1,564	76,000
Habiganj.	1,500		35	(None)

"Interesting and relevant studies have been made on the action of bacteriophage on cholera vibrios and dysentery bacilli. These are too technical to be detailed in this report. Briefly, cholera bacteriophage is of 9 types. These may occur in 511 possible combinations. Some combinations make the vibrios rough or smooth, some affect the agglutinability or even wholly transform the antigenic properties of the vibrio as demonstrated by cross agglutination and absorption tests. Some interfere with the ability of the cholera vibrio to ferment certain sugars and some enable vibrios to ferment other sugars such as lactose, ordinarily not fermented. As the carbohydrate fraction of the cholera vibrio is probably intimately associated with its virulence we hope that the following up of this research will give a clear explanation of the dramatic effects of bacteriophage which we have seen in the field."

The Assam Medical Research Society.—This society which is in fact an auxiliary of the institute and is financed partly by Government and partly by the I. R. F. A., by the Indian Tea Association and the Assam Oil Company, concentrated mainly on malarial research, surveys and preventive measures. Training of workers is in the forefront of the Society's programme and the last class in January was attended by 10 sub-assistant surgeons of the Public Health Department, 4 from the Medical Department, 8 from tea

estates and 1 each from the Assam Bengal Railway and the Assam Oil Company. A survey of the anophelines of Assam was continued in 27 places and, of the 26 species recorded, *A. minimus*, *A. maculatus* and *A. philippinensis* were incriminated as carriers with infectivity rates of 11·0%, 0·3% and 0·2%. Of a total of 33,540 blood examinations made, 20% were positive for malaria parasites. Nearly 20% of those examined were found to have enlarged spleen. In order to obtain cheaper methods of anti-larval work, the value of rice bran as a diluent of Paris green and the use of plasmoquin in treatment were investigated.

Burma Pasteur Institute and Bacteriological Laboratory.

110. Lt.-Col. L. A. P. Anderson, I.M.S., was Director throughout the year.

Anti-rabic treatment.—A total of 1,536 persons underwent the full course; 412 absconded; 893 were given advice but not treated; and 4 other cases were excluded for other reasons. Deaths numbered 7, all amongst Asiatics of class IV in whom symptoms of hydrophobia appeared before the protection afforded by inoculation had time to develop. The death rate was 0·5%. Of the total, 43 cases with 3 deaths had bites on the face, 1,071 with 4 deaths on the bare trunk or extremities, 202 on the clothed body and 220 were "licks". 1,374 cases with 6 deaths sought treatment within a week after the bite; 100 between 1-2 weeks; 33 with 1 death within 2-3 weeks; 9 within 3-4 weeks; and 20 at longer intervals. 40 cases with 1 death were under 4 years of age; 139 with 1 death, between 5—9 years; 131 with 1 death, between 10—14 years; 125 between 15—19 years; 463 with 2 deaths between 20—29 years; 324 with 1 death between 30—39 years; 175 with 1 death between 40—49 years; 102 between 50—59 years; 30 between 60—69 years and 7 of 70 years and over. In 235 cases with 1 death the biting animal was proved rabid; in 8 the animal was certified to be rabid; in 488 with 3 deaths the animal was probably rabid; in 791, with 3 deaths, the history of the animal was unknown; and in 14 the animal was probably not rabid. The dog was the biting animal in 1,507 cases and among these all the 7 deaths occurred; human being, 19; cat, 5; monkey and horse, 2 each; and jackal, 1.

Two treatment centres under the Burma Oil Company and 1 military centre at Maymyo also treated 42 cases; civil surgeons and other medical officers treated 216 patients at 35 hospitals in the province, although vaccine for 369 cases was issued.

181,472 c.cs. of anti-rabic vaccine were manufactured and the daily average of patients treated was 64. A 5% carbolised emulsion of sheep brain containing Kasauli fixed virus was used but a simplified form of treatment consisting of 1% vaccine was issued to civil surgeons and others for the treatment of patients locally. Cases of paralytic accidents, following anti-rabic inoculations, are rare but a fatal case of the kind was reported from Maymyo. With a view to open more treatment centres at the larger hospitals, a scheme was at work under which 6 sub-assistant surgeons are trained annually at this institute. A pamphlet in Burmese entitled "The danger of stray dogs" was issued. In order to provide a simplified form of treatment for mild dog bite cases of classes I and II at smaller hospitals, a detailed technical memorandum was circulated to civil surgeons, etc., and the cost of a treatment was reduced from Rs. 10 to Rs. 5.

The brains of 134 animals, including 129 dogs, were examined for rabies: 93 including 91 dogs, gave positive results.

Bacteriological Section.—A total of 20,146 bacteriological examinations were carried out. Of the total, 16,067 were serological examinations including 14,543 Wassermann's tests; 2,615 microscopical; 714 cultural; 528 chemical and bio-chemical; 158 histological; and 64 miscellaneous examinations. An extensive trial was made of the Wassermann technique known as "No. I method, Medical Research Council (Modified)." The Widal test has been carried out for the last few years by Felix's "qualitative receptor analysis" method. Dreyer's method, a recent modification of which includes also the use of suspensions of organisms in the "O" form, was tried experimentally; standard agglutinable suspensions and standardised high titre sera for the organisms of the enteric group are now prepared at this institute. During the year a case of "Scrub Typhus" was demonstrated serologically for the first time in Burma.

Issues of vaccines and sera included T. A. B. vaccine 27,192 c.cs.; autogenous vaccines 867 doses; stock curative vaccine 82 doses; anti-dysenteric serum 715,000 units and 1,510 c.cs.; anti-streptococcus 2,064 c.cs.; anti-diphtheritic 416,000 units; anti-tetanus 4,528,000 units; and anti-venine 7,360 c.cs.

Hydnocarpus oil, pure 172 lbs. with cresole 146,200 c.cs., and alepol solution 33,990 c.cs. were also issued.

Research Work.—Owing to shortage of staff, research work has been compulsorily curtailed. Work carried out or in operation included (*a*) a study of the comparative value of Felix's and Dreyer's methods for the Widal test; (*b*) an investigation of a standardised method for the erythrocyte sedimentation test for use in studying the progress of cases of leprosy and other diseases; and (*c*) Wassermann tests on 1,155 sera using both method No. 1, Medical Research Council (Modified) and the method in routine use at the institute.

Pasteur Institute, Calcutta.

111. This Institute is a part of the School of Tropical Medicine, Calcutta. A total of 7,532 patients chiefly from Bengal, B. and O. and the U. P., including 7,221 Indians and 311 Europeans, underwent a full course of treatment. 1,631 were given advice; 6 not at risk discontinued treatment; and 889 abandoned the treatment voluntarily. Excluding 4 cases which arrived at the institute with symptoms of the disease, deaths from hydrophobia numbered 38, of which 28 were classed as "failures". The death rate was 0·5% and the failure rate 0·4%. No deaths were reported among Europeans. Of the 7,221 Indian cases, 3,840 had severe bites on the naked skin and amongst these 28 deaths (0·7%) occurred; 2,586 had superficial bites on the bare skin, with 8 deaths (0·3%); 368 were bitten severely through clothing and of these 2 died; among the remaining 427 bitten superficially through clothing no mortality was reported. Of the 38 patients who died 25 came to the institute for treatment within a week after the bite, 9 cases 8—14 days late and the remaining 4 cases came 15—35 days late. In the case of 191 cases, the biting animal was proved to be rabid and among them the death rate was 1·0%; in 136 it was certified to be rabid; in 6,499 it was probably rabid; in 85 it was not rabid and in 621 the history of the animal was unknown. Of the 38 fatal cases, 4 developed hydrophobia during treatment, 6 within 15 days and 28 after 15 days of completion of treatment. One patient is reported to have developed paralysis after treatment.

The dog was the biting animal in 6,275 cases; jackal, 1,089; cat, 57; monkey, 64; rabid man, 16; horses and cow, 8 each; wild cat, 6; bear, 3;

mongoose and deer, 2 each; and pig and tiger, 1 each. The hydrophobia rate resulting from jackal bites was 1·6% and that from dog bites 0·3%. Of the 77 specimens examined for rabies, including 69 dogs and 6 jackals, 25 were positive.

Semple's carbolised 1% vaccine made from sheep's brain with the Paris strain of fixed virus was used. The treatment for licks was 5 c.cs. daily for 7 days and for bites 5 c.cs. daily for 14 days.

The provincial government having sanctioned the decentralisation of treatment, 19 out.centres were opened in the *muffassal* towards the close of the year.

Pasteur Institute, Bombay.

112. This Institute is a part of the Haffkine Institute, Bombay, and is directed by Dr. H. Maurice, I.S.O., I.M.D.

Pasteur Institute.—In all 2,532 persons applied for treatment; of these 1,594 persons underwent complete treatment, 154 discontinued treatment before the course could be finished and 784 needed no treatment. Of those who were treated 59 were Europeans. Most of the patients had bites on the bare trunk and extremities. Health returns from 97·1% of the cases treated were received. One death from hydrophobia occurred within and one death over 15 days after completion of treatment, giving a total mortality rate of 0·12%. In the case of 96 patients, the biting animal was proved to be rabid; in 36 it was certified to be rabid, in 178 it was probably so according to history and in 1,284 the history of the animal was unknown. One death took place among patients bitten by animals proved to be rabid and one death among those bitten by animals of unknown history. Dog was the biting animal in 1,535 cases (two deaths), cat in 28, monkey in 5, jackal in 16, horse in 2, mongoose in 1, pig in 1 and human beings in 6. Of the 219 brains examined including 209 dogs, 153 and 148 respectively were found positive.

Out-centres.—6,437 cases including 298 Europeans, received a full course of treatment at 56 out-centres; and 40 were advice cases. Three patients are said to have died of hydrophobia during treatment; 14 within 15 days and 17 more than 15 days after completion of treatment, giving a total mortality rate of 0·4%. Health returns of only 73·6% of cases treated were received, and the centres are being urged to get more complete information.

13 deaths occurred among those bitten on the face and 18 among those with bites on the trunk and extremities including 29 on the bare skin. In the case of 81 patients with no death the biting animal was proved to be rabid; in 497 with two deaths it was certified to be so; in 4,470 with 25 deaths it was probably so according to history; in 1,389 with four deaths the history of the animal was not forthcoming.

No patient developed paralysis after treatment either at the Institute or at the out-centres. 287 anti-rabic treatments were issued to veterinary surgeons for the treatment of dogs and other animals. Eight medical officers were trained in anti-rabic work.

Pasteur Institute, Patna.

113. A total of 3,636 cases were treated including 3,593 Indians and 43 Europeans; 611 were given no treatment; 654 abandoned the course; and the remaining 19 cases were not treated; of the last group of cases, 7 came with symptoms of hydrophobia, 10 developed hydrophobia before completion

of treatment and 2 died of other causes during treatment. All the 11 deaths from hydrophobia, giving a death rate of 0·3, occurred among Indians; 1 in cases of class II and 5 each in classes III and IV. Four deaths were recorded among patients with bites on the leg, 3 each on the arm and the face and 1 with multiple bites. Jackal bites were responsible for 9 and dogbites for 2. The hydrophobia rate for dogbites was 0·1% and for jackal bites 0·7% which shows that rabies in jackals in Bihar proper is of a more virulent type than in dogs.

The age at death of 2 patients was under 14 years, of 5 between 15 and 40 years and 4 between 40 and 60 years. In 10 of the 11 fatal cases, hydrophobia developed more than 14 days after the commencement of the treatment, the interval varying between 25 and 122 days.

In 22 cases the biting animal was proved to be rabid; in 10 it was certified to be rabid; in 2,404 with 11 deaths probably rabid; in 1,145 the history of the animal was unknown; and in 55 the animal was probably not rabid.

The dog was the biting animal in 2,186 cases; jackal, 1,359; monkey 25; cat and human being 12 each; horse 9; bear 7; rat 5; mongoose 3; buffalo, ox and cow 2 each; fox and squirrel 1 each; and in 10 cases the biting animal was unknown.

Although a total of 30,670 c. cs. of anti-rabic vaccine were issued, only 324 cases were treated at the Cuttack centre including 315 Indians and 9 Europeans; 188 of the former and 1 of the latter were at grave risk. 54 abandoned the treatment; 7 were given no treatment; and 1 case arrived with symptoms of hydrophobia and was not given treatment. Only 1 Indian, a class IV patient, died from hydrophobia. Two patients had bites on the face; 308 (1 death) on the trunk and extremities, including 268 (1 death) bitten on the bare skin and 40 through clothing; and 14 licks only. The dog was the biting animal in 203 cases with 1 death; jackal 105; wolf 6; monkey 4; cat 3; and human being, rat and tiger 1 each.

Reports were received from 76% of the Indian cases treated at the institute and from 33% of those at Cuttack. Reports received from European cases were 72% at the institute and 67 % at the centre.

Semple's 1% carbolised vaccine was used up to 16th February, 1933, and thereafter 2% carbolised vaccine. Treatment lasted for 14 days except in 75 cases at grave risk who were given 21 days' treatment. Of 78 brains examined for rabies, 63 were positive.

Following the issue of Government letter No. 8933-L. S. G., dated the 9th November, 1932, sanctioning the supply of anti-rabic vaccine on demand from civil surgeons for treatment of cases in the *muffassal* on payment of Rs. 10 per case, 6 cases were treated in the districts. The issue of the vaccine from the institute for inoculation of domestic animals was also sanctioned by the provincial Government in their letter No. 1122-L. S. G., dated the 19th July, 1933, at Rs. 10 per case for cats and dogs and Rs. 25 per case for horses or larger quadrupeds; 5 such cases were treated during the year.

Medico-legal work.

114. Table VIII (x) summarises the medico-legal work done in those provinces employing a chemical examiner.

TABLE VIII (x).

	Cases investigated.	Cases detected.	Samples examined.
British India	10,668	6,692	34,464
N.-W. F. P.	363	284	1,040
Punjab	2,257	1,785	8,114
U. P. and C. P.	1,604	984	4,290
Bengal	2,156	1,219	5,135
Bombay	1,113	743	5,615
Madras	1,348	961	6,959
Burma	1,827	716	3,311

N.-W. F. P.—374 cases comprising 1,065 articles were investigated. 34 of the 69 human poisoning cases were fatal. Stain specimens numbered 280. Poison was detected in 55 % of human cases, cattle poisoning 67%, murders, etc., by violence 87% and sexual crimes 85%. Arsenic was the commonest poison detected. 15 articles in connection with cocaine and its adulterants, 3 samples of *charas*, 3 of explosives, 2 of whisky, 1 of opium and 1 of *lahan* were analysed.

Punjab.—A total of 3,557 cases comprising 11,096 articles were examined. Out of 937 human and 60 cattle poisoning cases investigated, 573 and 56 were fatal. 1,247 stain specimens were examined, 88 of these being for the examination of blood and human hair. Poison was detected in 69% of the human cases. The poisons most commonly used were opium 51 % arsenic 19%, *dhatura* 10%, alcohol 6% and mercury 2%. Among others, 51 samples of water, 8 of ghee, 134 of spirituous preparations and 24 of chloroform were received for examination.

U. P. & C. P.—399 suspected cases of human poisoning were investigated the total number of medico-legal cases received being 1,604 involving 4,290 examinations. 2,126 analyses were done during the year and 1,140 stain cases were examined. Arsenic, *dhatura* and opium were the commonest poisons.

Bengal.—Of the 2,156 medico-legal cases investigated, positive results were obtained in 1,219. Medico-legal articles examined numbered 5,643, including 508 samples of preservatives. Poison was detected in 209 cases. As usual, the most common poison used in fatal human poisoning cases was opium. This drug was detected in 144 articles or 46 % ; arsenic in 12%, oleander in 12%, alcohol in 9%, aconite in 5%, carbolic acid in 4% and nitric and hydrocyanic acids and their salts in 3 % each. Poison was detected in 189 of the 522 samples said to be vomited matter or excreta with or without accompanying viscera. 3,104 stain cases were analysed.

Bombay.—5,615 medico-legal examinations were carried out and 1,113 cases were investigated, including 553 of suspected human poisoning, 485 stain cases, 36 suspected animal poisoning and 39 miscellaneous. Other examinations included 2,738 samples from the excise department, 284 for government stores and 441 miscellaneous. Amongst the 553 suspected human poisoning cases, poison was detected in 256, with 105 deaths, opium being present in 149, arsenic in 23, *dhatura* in 22 and other poisons in 62. As regards animal cases, poison was detected in 18, yellow oleander (*Cerbera thevetia*) in 9, arsenic in 8 and copper sulphate in 1 ; 29 cases were fatal. Reports were made on 178 samples of ghee, milk, flour, sugar and lime-juice, 33 medicines and chemicals ; and 3 others.

Madras.—1,518 cases, comprising 7,129 articles were received for analysis, including 372 for human poisoning, 23 for animal poisoning, 805 for stains and 95 miscellaneous. Poison was detected in 173 human poisoning cases or 46% of the total. Opium, oleander, arsenic and mercury were the commonest poisons detected. Of the animal poisoning cases, 12 or 52 % were positive ; the common animal poisons were oleander 9 cases and arsenic 3 cases.

Burma.—8,538 examinations were made and the number of medico-legal cases was 1,827. Of 444 cases of suspected human poisoning investigated, poison was detected in 187, the most common being arsenic, opium and *dhatura*.

INDIAN RESEARCH FUND ASSOCIATION* (I. R. F. A.)

General.

115. The following is a brief summary of the salient points of the investigations undertaken by workers of the Association during the financial year 1933-34. In order to obtain details, however, reference must be made to the reports published in the I. J. M. R., in its Memoirs and in the Records of the Malaria Survey of India,—the organs for publication of the work of the Association,—in the I. M. G. and other papers. A detailed list is given in the appendix to this section (page 356). A short resumé of the different investigations will also be found in the published report of the S. A. B. of the I. R. F. A. which is now available as a priced publication.

Malaria.

116. A. *Malaria Survey of India* : (*a*) *General.*—Lt.-Col. J. A. Sinton, V.C., I.M.S., was Director throughout the year. Capt. H. W. Mulligan, I.M.S., and Lt.-Col. G. Covell, I.M.S., acted as Assistant Directors in succession. Capt. P. J. Barraud held the post of Entomologist until 9th December when he proceeded on leave pending retirement. Dr. E. P. Hicks was appointed as malaria research officer. Major R. C. Watts, I.M.S., an officer of the Medical Research Department was posted temporarily and Mr. Raja Ram was appointed as Malaria Engineer.

(*b*) *Classes and instructional work.*—The annual malaria class was held at Karnal from 13th March to 22nd April. 17 students attended of whom 14 passed the examination. An officer of the U. P. Public Health Department, holding a Rockefeller scholarship was given instruction in field and laboratory work, research, etc., at Karnal, Kasauli and Sind. Another research worker holding a grant from the Rockefeller Foundation was provided with laboratory accommodation, and facilities for research work on the bionomics of the Indian anophelines. A Siamese public health officer was deputed by the Rockefeller Foundation for study at Karnal.

The Director continued to act as Editor of the Records of the Malaria Survey of India. Further additions were made to the library.

(*c*) *Entomological Collections.*—Numerous requests were received from India and elsewhere for identification of collections of mosquitoes and sandflies. A mounted collection consisting of 410 adults and 200 larvae of the more important Indian anophelines was sent to Singapore for the League of Nations' malaria class and large numbers of living anopheline mosquitoes were supplied in Barraud's boxes to the Ministry of Health, London, for research work.

*The report of the Scientific Advisory Board of the " I. R. F. A." for the year 1933-34, Price Re. 1, obtainable from Secretary, G. B., I. F. R. A., New Delhi (November-March), Simla (April-October).

(*d*) *Sind Malaria Enquiry.*—Valuable data have been obtained as to the effect of the first year's operation of the Barrage Scheme on the incidence of malaria in Sind. A special investigation was undertaken in malaria in Khairpur State, where there has been extensive water-logging of a serious nature due to seepage from one of the new main canals.

The effects of the regional malarial epidemic of 1929 were being followed up by surveys made in special areas in Northern Sind every few months.

An investigation into the seasonal prevalence of the different species of malaria parasites was being made in Larkana taluka. Blood slides were taken from a number of school children each month, and accurate parasite counts were made on the slides obtained.

Experiments were continued into the utility and cost of Paris-green as an anti-malarial measure for small towns and villages.

(*e*) *Anti-malarial measures.*—Experiments into the utility and cost of Paris-green as an anti-malarial measure for small towns and villages were continued and the results, as evaluated by the incidence of malaria and the prevalence of anophelines in the controlled areas, compared with an adjacent uncontrolled village were encouraging. Other experiments were carried out on the efficacy of various samples of Paris-green and of different diluents; automatic distribution of Paris-green on small irrigation channels; and the breeding of Gambusia.

(*f*) *Entomological.*—The results of the investigation on the longevity of specimens of *C. fatigans* infected with bird malaria were published. The effects of physical conditions, *e.g.*, temperature and humidity, on the longevity of certain species of Indian anopheles were examined; work on the factors influencing the relative proportions of male and female anophelines which hatch from larvae was completed; and the biological conditions affecting the infectivity of anophelines were examined. Large numbers of serial sections of the different stages in the life history of mosquitoes were prepared both for instructional and research purposes. Other work included the routine investigations into the numerical and seasonal prevalence of different species of anophelines and their bionomics; and the geographical distribution of the Indian anophelines.

(*g*) *Biochemical.*—The chemical and physical nature of malarial pigment was studied in detail and investigations into variations in the blood proteins in malaria were in progress.

(*h*) *Insect transmission of malaria.*—Infections with *P. cynomolgi* have been transmitted from *S. rhesus to S. rhesus* by the bites of *A. annularis* (3 animals) and of *A. subpictus* (one animal). These are the first successful attempts recorded of experimental transmission of monkey malaria by a mosquito. The results of a study of the duration of infectivity of *C. fatigans* infected with bird malaria were published.

B. *Malaria treatment centre at Kasauli.*—Investigations were carried out on the effects of atebrin; atebrin followed by plasmoquine; and tebetrin; and in the treatment of chronic relapsing cases of benign tertian malaria and relapsing cases of malignant tertian malaria. Although the percentage of relapses was disappointing, no modification of the opinion expressed in previous reports was called for.

C. *Malaria transmission enquiry.*—This enquiry was carried out by Dr. C. Strickland at the Calcutta School of Tropical Medicine. The air conditioning cabinet continued in constant use and the infection rate in experimental

mosquitoes was worked (*a*) by serial sectioning and (*b*) by dissection. The results indicate that the highest M. T. infection is in the cold and post-monsoon weather and the lowest during spring and the hot weather, while in the monsoon there is moderate infection. The infection with B. T. is heavier in the monsoon and post-monsoon season than at other seasons and the highest quartan infection is post-monsoon. For further details the report of the S. A. B. should be consulted.

D. *Malaria Section of the Assam Medical Research Society.*—The main lines of the enquiry included (i) cheaper methods of malaria control. The results suggest that the dusting of rice bran with Paris-green may prove a useful method of reducing the anopheline population in breeding areas; (ii) the investigation of the anophelines concerned in the transmission of malaria in Assam: their distribution, life histories and infectivity rates; (iii) the value of mass treatment of children with plasmoquine in the reduction of malaria and total sickness in a community (*a*) in an isolated estate and (*b*) in a town. The field experiments in an isolated estate on the value of plasmoquine in reducing malaria and total sickness showed high parasite rates but considerably reduced spleen rates. The latter investigation suggested that extensive breeding and high infectivity of *A. minimus* contributed to frequent re-infection; and (iv) investigation of the seasonal variation in gametocyte production according to age of carrier and species of parasite.

E. *Malaria in Calcutta.*—The following points *inter alia* were investigated:—(i) relative prevalence of adult female mosquitoes at different seasons and at different times of the day; (ii) the avidity with which they feed at different seasons; (iii) whether *A. stephensi* shows any preference for feeding on persons of different races. The observations made were not analysed but seemed to suggest that the cold weather, hot weather and rains produce more and more mosquitoes in that order and the avidity with which they bite is also in that order.

Plague.

117. (A) *Plague researches at the Haffkine Institute*: (*i*) *Plague vaccine.*—The biological tests devised by Sokhey and Maurice have shown further that the Haffkine's prophylactic is superior in immunising value to other antiplague vaccines at present being made. But it has one great disadvantage; it is very toxic, *i.e.*, it produces severe local and general reaction on subcutaneous inoculation. Experiments were in progress with a view to reduce the toxicity of the vaccine by preparing it from avirulent cultures; by using a mixture of plague vaccine and anti-plague buffalo serum; and by using a mixture of plague vaccine and normal buffalo serum and by the addition of Gum Ghatti.

(*ii*) Experiments as to the effect of storage at 5-8° C on the virulence of *B. pestis* cultures showed that virulence remained undiminished.

(*iii*) *Anti-plague serum.*—Sokhey and Maurice have worked out a biological method on the same lines as that for measuring the relative immunising value of anti-plague vaccines. The method aims at a quantitative measurement of the minimum amount of serum that would protect more than half of the animals inoculated against a measured amount of test dose of *B. pestis* given at the same time as the serum; but separately from it. Other work included (*a*) concentration of serum and (*b*) tests of the serum in the field.

(*iv*) *Epidemiology of plague.*—This work included investigations into the comparative immunity of rat populations in the towns and cities of the United Provinces and the Central Provinces.

(*B*) *Plague recrudescence enquiry in the Cumbum Valley, Madras Presidency.*—This enquiry was conducted by Dr. George, Research Health Officer, under the supervision of the Director of Public Health, Madras and the Director of King Institute, Madras. The work included (*a*) plague recrudescence problems with reference to house rats and their fleas as off season reservoirs ; wild rodents and their fleas as off season reservoirs ; man as a possible reservoir ; and the carry-over experiment to determine for how long a period the starving fleas could carry over infections ; (*b*) a monthly rat survey of Cumbum town ; (*c*) cyanogas fumigation of rat burrows ; (*d*) conveyance of rats and fleas through grains and personal effects ; and (*e*) an efficient method of disinfestation of grain and personal effects under field conditions. Further details will be found on page 47 of this report.

Cholera and bacteriophage.

118. A. Field experiments with cholera bacteriophage were carried out under the D. P. H. at 3 large festivals in the Madras Presidency, each attended by nearly a million pilgrims. None of the festivals was followed by an outbreak of cholera and further experimental work was being continued to confirm the results obtained.

B. *Cholera bacteriophage in Assam.*—This enquiry was carried out under the direction of Lt.-Col. Morison, Pasteur Institute, Shillong. The field work included (*i*) the prevention of epidemic cholera by the distribution to villages of a dysentery-cholera bacteriophage for the treatment of all cases of diarrhœa, dysentery and suspected cholera by the villagers themselves ; and (*ii*) the treatment of outbreaks of cholera by bacteriophage under village conditions and the effects produced on mortality and infectivity. For details please see pages 206-207 of this report.

C. *Bactericphage enquiry.*—The activities of this enquiry at Patna under Dr. Igor N. Asheshov were limited to pure basic research in accordance with a decision of the S. A. B. The problems chosen were studied in such a way that the results obtained might help the practical application of bacteriophage and lead to the improvement of the choleraphage mixture used for therapeutic and preventive purposes. During the year, attention was mainly paid to the systematic application of the methods developed previously for the study of the properties of choleraphages. Owing to the highly technical character of this work it is not possible to give further details here and the original report of the S. A. B. should be consulted.

Kala-azar.

119. A. *Kala-azar enquiry at Calcutta.*—This enquiry was continued at the School of Tropical Medicine. The work of the enquiry has been reported on under the following heads ; (*i*) bionomics of *P. argentipes*,—the bionomic studies included breeding sites of *P. argentipes* in 2 villages in Bengal and Sikkim ; the effect and relative merits of crude oil, phenol and necrosene as larvicides ; the duration of life of *P. argentipes* in nature, etc ; (*ii*) dietetic experiments : experiments were carried out to determine the effect of diet on the course of leishmania infection. The supra-renal content of 5 old hamsters which had been on a diet of soaked gram only for about 2 years were compared with 5 received from China and it was found that in 3 of the 5 old hamsters the adrenalin content of the supra-renals was much increased ; (*iii*) the treatment of dermal leishmaniasis ; (*iv*) transmission: attempts were made to determine the age of the fly at which an infective feed is given ; (*v*) mechanism of infection : the possible rôle played by hookworm in lowering the resistance

to kala-azar was being studied in dogs; (*vi*) the effect of pregnancy on intensity of infection; (*vii*) experiments to study the effect of injection of tissue extracts on the course of infection; these yielded no significant results; (*viii*) Efficacy of vaccination; (*ix*) antibodies in kala-azar; (*x*) cytological studies in kala-azar were extended to include monkeys, hamsters and mice.

B. *Leishmania vaccine enquiry.*—This enquiry under Dr. Ray was continued at the Central Research Institute, Kasauli. Studies on the cultivation, morphology, serology and vaccine treatment of leishmania were continued.

Leprosy.

120. *Leprosy enquiry.*—This enquiry on the bacteriology and pathology of human and rat leprosy was conducted by Dr. Lowe at the School of Tropical Medicine, Calcutta. The bacteriological work was carried out under the following heads :—(*a*) experiments to culture *M. leprae*; (*b*) filtration of emulsions of *M. leprae muris* made from the organs of rats suffering from rat leprosy and injection of the filtrate into healthy rats; (*c*) the action of sodium hydnocarpate on *M. leprae muris* and (*d*) the staining of *M. leprae* in sections. The systematic study of the pathology of human leprosy was continued and interesting *post mortem* material was collected; results will be published. Bacillaemia in leprosy was also studied and the results were published in the I. M. G. It was found that bacillaemia does occur in leprosy, very rarely in nerve leprosy and more frequently in skin leprosy but its detection is difficult and quite unnecessary for diagnosis.

Nutrition.

121. *Nutritional research at Coonoor.*—This work remained under the direction of Major-General McCarrison. The results of the investigations carried out were reported under the following headings :—(*a*) urinary calculus and ground nut goitre; (*b*) tissue culture; (*c*) hydrogen-ion concentration; (*d*) spectrography; (*e*) analytical work. Twelve scientific papers embodying the results of the research work carried out were published in the I. J. M. R. (see page 356).

Tuberculosis.

122. A. *Tuberculosis enquiry at the Haffkine Institute, Bombay.*—This enquiry was under the direction of Dr. Soparkar. The work done has already been referred to on page 199 of this report.

B. *Tuberculosis enquiry at Calcutta.*—This enquiry was carried out under the direction of Dr. Ukil and the work included (*a*) the identification of types of tubercle baccilli from human sources; (*b*) the histopathology of lung tuberculosis in India; (*c*) the action of natural sunlight as a factor in resisting tuberculous infection in experimental animals; and (*d*) certain aspects of the epidemiology of the disease. A paper entitled "Tuberculosis in infancy and childhood" was published in the Indian Journal of Pediatrics (October, 1933).

Vaccines.

123. *Anti-rabic vaccine enquiry at the Pasteur Institute of India, Kasauli.*—Experiments were continued to test (*a*) the use of immune serum and its post-infectional immunising value as an adjunct to vaccine treatment; (*b*) the post-infectional value of chemical agents in preventing rabies; (*c*) the neutralising action, if any, of anti-rabic serum on fresh rabies fixed virus; (*d*) the duration of

immunity in immunised animals ; (*e*) the preparation of an improved vaccine for animals ; (*f*) the photodynamic action of methylene blue on rabies fixed virus ; (*g*) the conservation of street virus at a low temperature ; (*h*) the keeping properties of 5 % carbolised vaccine ; and (*i*) morphological and serological studies. An account of this work has also been given under the P. I. of India, Kasauli (page 203).

Helminthology.

124. A. *The helminthological enquiry at the Central Research Institute, Kasauli*, was under the direction of Dr. Korke who continued to add to the helminthological collection of specimens in the institute. Identification of new specimens was carried out and further helminthological literature was indexed. The investigation on filariasis was continued and the results were published in the I. J. M. R., Volume XXI, October, 1933, and January, 1934, which should be consulted for details.

B. *Helminthological enquiry at the School of Tropical Medicine, Calcutta.*—This enquiry was continued by Dr. Maplestone. The study of the toxicity of hexylresorcinol was completed ; that of carbon tetrachlorethylene was in progress ; and the papers embodying the results obtained were published in the I. J. M. R., Volume XXI, No. 3. Another paper " A simple method of growing hookworm larvæ " was published in the I. J. M. R., Volume XXII, No. 2. Some interesting and suggestive results were obtained from a study of gnathostome infection in cats.

C. *Filariasis enquiry at the School of Tropical Medicine, Calcutta.*—This enquiry was conducted by Dr. Sunder Rao. His investigations included (*a*) survey ; (*b*) dermal tests for the detection of filarial infection ; (*c*) the values of complement fixation test in the detection of filarial infection ; (*d*) study of protein fractions in cases of filarial lymphangitis ; and (*e*) guinea worm infection.

Miscellaneous.

125. *Maternal mortality and morbidity in child-birth in India.*—This enquiry was conducted by Dr. Mudaliar in Madras. A report on the causes of maternal mortality and morbidity in Madras City was submitted to the Madras Government. Other investigations included (*a*) the incidence and treatment of anaemias of pregnancy ; further material was collected as regards the value of the various therapeutic agents in the treatment of this condition ; (*b*) the bacteriology of puerperal sepsis ; (*c*) prophylactic use of vitamin therapy in selected areas ; and (*d*) effects of tropical diseases on pregnancy and parturition.

126. *Enquiry on the bionomics and early stages of phlebotomus.*—This enquiry was carried out by Dr. Puri at Landi Kotal (Khyber agency). The work included (*a*) the collection of sandflies. Of the 90,000 flies collected, 90 % belonged to the species *P. papatasi*, the suspected transmitter of the fever ; (*b*) the finding of breeding places ; (*c*) tests of larvicides and other substances, *e.g.*, lime, crude oil, carbon-bisulphide emulsion, etc. Transmission experiments were carried out at the Central Research Institute, Kasauli.

127. *Protozoal parasites enquiry at the Pasteur Institute of India, Kasauli.*—This enquiry was carried out by Lt.-Col. H. E. Shortt, I.M.S. The method of transmission of *Babesia canis*, the cause of tick fever in dogs and the life history of the parasite were studied. Other work included experiments with *Triatoma rubrofasciata* and *Trypanosoma cruzi* and a study of lencocytozoa of birds.

128. *Skin diseases enquiry under the Director, School of Tropical Medicine, Calcutta.*—60 species of actinomyces were collected and their cultural character on different media as well as their biological activities, *e.g.*, peptonization of milk, proteolytic and haemolytic reaction were being studied. Further study of *Pityriasis rubra* was continued ; a systematic study of psoriasis was also commenced.

129. *Indigenous drugs enquiry at the School of Tropical Medicine, Calcutta.*—This was under the direction of Lt.-Col. Chopra, I.M.S. The chief aspects of this investigation were (*a*) the isolation of an alkaloid, *Kurchicine*, with a low melting point from *H. antidysenterica* and a study of its pharmacological action ; (*b*) the study of *Rauwolfia serpentina* ; (*c*) evolution of a safe and reliable method of biological assay suitable for testing the potency of digitalis preparations in the tropics ; (*d*) biochemical studies with the enzyme obtained from cucumber ; (*e*) action of ephedrine and pseudo-ephedrine isolated from the Indian species of *Ephedra* ; (*f*) action of snake venoms, Indian daboia (Russell's viper) and *Echis carinata* ; and (*g*) changes in the physical properties of blood sera in health and disease. In addition, pharmacological and clinical research in connection with a number of remedies of therapeutic importance in tropical climes was carried out and the effects of carbarsone in intestinal amœbiasis and of tetrachlorethylene and hexyl resorcinol, two anthelmintic remedies of promise, were tested. Research was also continued in connection with certain synthetic antimalarial remedies and pharmacological, chemotherapeutic and clinical studies were made of such drugs as atebrin, plasmoquin, malarcan, tebetrin, etc. For further details, a reference should be made to published papers, a list of which is given in appendix (page 356).

130. *Drug addiction enquiry at the Calcutta School of Tropical Medicine.*—This was under the direction of Lt.-Col. Chopra, I.M.S. A study of the habitual use of morphine and the pharmacological action of hydrocotarnine resorcinol hydrochloride, a derivative of opium were completed and results were published in I. J. M. R. Work was also done on the incidence and effects of alcoholic beverages commonly used in India and progress was recorded in the study of infantile administration of opium. Work was carried out in Delhi, U. P. and B. & O. ; records of biopsy and autopsy examinations in the pathology departments were studied and specimens of exceptional interest and importance were noted.

131. *Statistical enquiry.*—This was carried out by the Public Health Commissioner with the Government of India in continuation of the work done in previous years. Mortality statistics of cholera, smallpox, fevers, dysentery and diarrhœa and respiratory diseases by districts in each province for the period 1877-1931 were collected and a series of maps, charts and graphs prepared.

132. *Special grants.*—(*i*) A grant of Rs. 68,400 was made to the Calcutta School of Tropical Medicine to meet the pay of the Professors of Pathology and Bacteriology and of Protozoology and Entomology. (*ii*) A sum of Rs. 20,000 was provided towards the pay of Dr. E. Muir, M.D., as Director of Leprosy Research. (*iii*) £100 was contributed to the Imperial Institute of Entomology, London. (*iv*) £150 was contributed to the Bureau of Hygiene and Tropical Diseases, London. (*v*) Rs. 700 was provided for the I. R. F. A. library, Central Research Institute, Kasauli, for the purchase of books and journals, and (*vi*) a grant of Rs. 15,000 was made to the Medical Research Society, Assam.

SECTION IX.

MEDICAL INSTITUTIONS.

I.—Hospitals and Dispensaries.

A.—British India.

General and Statistical.

133. In British India,* at the end of 1933, 6,548 hospitals and dispensaries were available for a population of 271 millions. These included 5,154 state-public, local fund and private aided institutions, 861 state-special and railway and 533 private non-aided hospitals and dispensaries. The figures relating to 140 institutions in Indian States were included in the Bombay reports during past years but they have now been excluded owing to the transfer of their control from the provincial to the Central Government. Owing to financial stringency, progress in the expansion of medical relief in rural areas by subsidising medical practitioners, etc., has been slow. Whilst the Punjab scheme which aims at providing one dispensary per one hundred square miles and per 30,000 of the population is not ideal, it should serve as a stimulus to other provinces.

141 new institutions were opened, including 105 in rural and 36 in urban areas; of the 65 institutions closed, 51 were rural and 14 urban. Provincial details are given in Table IX (*i*). In the last column of this table are included the average populations served in British India as a whole by each of these institutions during 1933.

TABLE IX (i).

	Classes I, III. and IV.		Classes II and VI.		Class V.		Total.		Average population served per institution.
	1933.	1932.	1933.	1932.	1933.	1932.	1933.	1932.	1933.
British India	**5,154**	**5,108**	**861**	**872**	**533**	**651**	**6,548**	**6,631**	**41,308**
N.-W. F. P.	67	59	35	35	7	6	109	100	22,248
Punjab	778	774	187	193	8	7	973	974	24,235
Delhi	25	25	2	2	...	...	27	27	23,565
U. P.	481	491	103	102	77	61	661	654	73,236
B. & O.	536	525	84	83	66	67	686	675	54,924
Bengal	974	944	119	122	175	175	1,268	1,241	39,522
C. P.	229	229	50	49	50	49	329	327	47,136
Bombay	414	414	80	82	40	180	534	676	41,069
Madras	1,165	1,167	77	80	94	90	1,336	1,337	34,985
Coorg	11	11	...	...	3	3	14	14	11,669
Assam	208	206	43	44	7	7	258	257	33,420
Burma	231	228	71	70	2	2	304	300	48,247
Baluchistan	35	35	10	10	4	4	49	49	9,459

Abbreviations:—
M. . . Male.
F. . . Female.
R. . . Rural.
U. . . Urban.
p.m. . . per mille.
C. P. . . Central Provinces and Berar.
U. P. . . United Provinces of Agra and Oudh.
B. & O. . . Bihar and Orissa.

Class I.—State-public.
Class II.—State-special.
Class III.—Local, municipal fund and subsidised dispensaries.
Class IV.—Private-aided.
Class V.—Private non-aided.
Class VI.—Railways.

* Excluding Aden (see page 237).

TABLE IX (ii).

	Classes I, III and IV.		Classes II and VI.		Class V.		Total.		Grand Total.	Average population served per institution.	
	R.	U.	R.	U.	R.	U.	R.	U.		R.	U.
British India	**3,521**	**1,594**	**375**	**468**	**339**	**193**	**4,235**	**2,255**	**6,490**	**56,971**	**12,818**
N.-W. F. P.	32	21	6	13	2	4	40	38	78*	50,972	10,163
Punjab	590	188	124	63	4	4	718	255	973	28,570	12,029
U. P.	269	212	17	86	56	21	342	319	661	125,685	17,005
B. & O.	463	73	42	42	54	12	559	127	686	64,443	13,022
Bengal	568	406	26	93	101	74	695	573	1,268	66,805	6,430
C. P.	119	110	13	37	32	18	164	165	329	84,284	10,233
Bombay	157	257	27	53	17	23	201	333	534	84,464	14,875
Madras	975	190	44	33	61	33	1,080	256	1,336	37,610	24,755
Coorg	9	2	...	...	3	...	12	2	14	12,792	4,913
Assam	170	38	22	21	5	2	197	61	258	42,684	3,499
Burma	137	94	46	25	...	2	183	121	304	71,842	12,562
Baluchistan	32	3	8	2	4	...	44	5	49	8,443	18,405

* Excluding 31 in the Agencies.

Table IX (ii) gives the distribution of hospitals and dispensaries in rural and urban areas, as well as the average populations served in these areas in the different provinces. In some cases the situation as regards rural medical relief deserves serious attention.

Table IX (iii) gives the numbers of available beds by provinces.

TABLE IX (iii).

	Classes I, III and IV.		Classes II and VI.		Class V.		All classes.		
	M.	F.	M.	F.	M.	F.	M.	F.	Total.
British India	**34,663**	**21,803**	**7,708**	**460**	**2,419**	**2,240**	**44,790**	**24,503**	**69,293**
N.-W. F. P.	794	463	647	...	181	22	1,622	485	2,107
Punjab	5,335	3,934	819	57	49	87	6,203	4,078	10,281
Delhi	266	535	54	1	...	...	320	536	856
U. P.	4,224	2,653	1,347	33	235	287	5,806	2,973	8,779
B. & O.	2,693	1,461	715	73	497	364	3,905	1,898	5,803
Bengal	4,118	2,315	1,837	96	610	283	6,565	2,694	9,259
C. P.	1,320	843	313	6	119	258	1,752	1,107	2,859
Bombay	3,919	3,178	393	48	444	327	4,756	3,553	8,309
Madras	5,531	4,094	260	36	213	473	6,004	4,603	10,607
Coorg	88	66	...	...	...	...	88	66	154
Assam	771	310	444	49	45	35	1,260	394	1,654
Burma	5,184	1,798	779	56	8	100	5,971	1,954	*7,925
Baluchistan	420	153	100	5	18	4	538	162	706

* Excluding 10 beds for cholera cases and 18 special beds.

The number of beds for females in general and women's hospitals and dispensaries of classes I, III and IV in some of the provinces are given in Table IX (iv).

TABLE IX (iv).

		Women's hospitals.		
	General hospitals.	Women's hospitals.	Total.	Total in-patients treated.	Indoor daily average.
Total	**15,281**	**6,048**	**21,329**	**145,233**	**4,430**
N.-W. F. P.	279	184	463	3,804	125
Punjab	2,544	1,390	3,934	26,080	1,002
U. P.	1,157	1,496	2,653	28,735	786
B. & O.	1,256	205	1,461	3,444	169
Bengal	1,909	406	2,315	11,735	297
C. P.	545	298	843	7,908	292
Bombay	2,392	786	3,178	23,648	580
Madras	3,223	1,151	4,374	36,348	1,079
Assam	310	..	310	..	..
Burma	1,666	132	1,798	3,531	100

The numbers treated again increased by 1,687,869. Of the total 88 % were treated in state-public, local fund and private-aided institutions; 6 % in state-special and railway hospitals and dispensaries; and 6 % in private non-aided institutions. Table IX (v) gives the totals of different groups of institutions at quinquennial intervals since 1911.

TABLE IX (v).

	Classes I, III, IV.	Classes II, VI.	Class V.	Total.	Patients treated.
1911	2,707	829	706	4,242	34,936,704
1916	3,051	872	688	4,611	42,291,098
1921	3,454	882	708	5,044	45,091,697
1926	4,189	919	614	5,722	53,064,623
1931	5,072	896	653	6,621	72,467,584
1933	**5,154**	**861**	**533**	**6,548**	**75,169,032**

Since 1911 the number of hospitals and dispensaries in British India has nearly doubled whilst the number of patients has increased by 115 %. During 1933, Madras and Punjab together contributed nearly 43 % of the total. Compared with 1932, Madras recorded an increase of 595,852, Punjab 1,294,160, N. W. F. P. 412,501, Bengal 712,091, Burma 186,330, U. P. 268,041 and Delhi 110, 773. Other provinces recorded decreases. Table IX (vi) gives provincial details.

Numbers of cases treated for some of the more important infectious diseases are given in Table IX (vii). Malaria alone was responsible for 17 % of the total.

Details of medical personnel employed are given in Appendix VII (page 370).

Of the total surgical operations, nearly 90 % were performed in institutions of classes I, III and IV. Details are given in Table IX (viii).

TABLE IX (vi).

	Classes I, III and IV.				Classes II and VI.				Class V.		Total.	
	Indoor.		Outdoor.		Indoor.		Outdoor.					
	1932.	1933.	1932.	1933.	1932.	1933.	1932.	1933.	1932.	1933.	1932.	1933.
British India	1,008,412	1,065,018	62,012,286	64,741,914	110,899	112,536	4,706,787	4,646,642	5,642,779	4,602,922	73,481,163	75,169,032
N.-W. F. P.	26,348	30,169	1,498,633	1,875,267	8,941	10,912	123,413	131,994	90,768	112,262	1,748,103	2,160,604
Punjab .	191,276	193,098	12,615,457	13,828,674	9,303	9,927	1,308,337	1,374,969	109,284	121,149	14,233,657	15,527,817
Delhi .	18,155	20,423	965,222	1,057,671	1,519	2,046	31,225	46,754	...	...	1,016,121	1,126,894
U. P. .	113,633	119,655	6,765,556	6,944,788	17,626	16,862	537,230	560,190	710,397	770,988	8,144,442	8,412,483
B. & O. .	66,557	70,909	5,914,809	5,718,422	8,698	8,940	363,817	400,661	896,242	890,358	7,250,123	7,089,290
Bengal .	102,325	111,567	7,092,586	7,636,558	25,122	25,156	622,741	635,991	1,589,144	1,734,737	9,431,918	10,144,009
C. P. . .	34,035	35,507	2,996,603	2,871,962	5,139	4,687	214,227	215,020	253,609	251,322	3,503,613	3,378,498
Bombay .	104,534	112,720	3,630,440	3,097,598	8,999	10,781	452,615	457,990	1,243,744	241,170	5,440,332	3,920,259
Madras .	210,319	224,888	14,627,647	15,722,769	7,419	4,813	621,356	393,171	564,987	281,939	16,031,728	16,627,580
Coorg .	4,833	4,900	284,056	276,705	...	...	...	...	7,639	7,995	296,528	289,600
Assam .	15,739	16,777	2,282,321	2,232,294	4,972	4,897	126,430	119,876	88,836	101,401	2,518,298	2,475,245
Burma .	111,045	114,420	2,722,662	2,890,801	12,187	12,446	233,264	247,100	7,421	8,142	3,086,579	3,272,909
Baluchistan	9,613	9,985	616,294	588,405	974	1,069	72,132	62,926	80,708	81,459	779,721	743,844

TABLE IX (vii).

	Influenza.	Dysentery.	Enteric fever.	Gonorrhœa.	Syphilis.	Kala-azar.	Malaria.	Leprosy.	Relapsing fever.	Pneumonia.	Pyrexia of uncertain origin.	Tuberculosis of the lungs.	Other tubercular diseases.	Ankylostomiasis.
British India . . .	**879,630**	**1,163,414**	**72,804**	**291,914**	**335,986**	**142,301**	**12,769,243**	**93,603**	**4,982**	**180,052**	**1,570,935**	**158,291**	**86,984**	**164,480**
N.-W. F. P. . . .	2,110	23,173	1,290	1,731	7,196	...	627,024	94	20	6,646	13,207	5,760	4,106	661
Punjab	16,568	193,143	21,626	13,472	18,178	106	3,062,837	631	236	39,660	67,497	16,253	13,673	2,296
Delhi	119,560	16,071	1,118	6,976	7,299	...	165,439	53	23	5,195	4,015	4,210	4,441	59
U. P. . . .	66,197	115,799	6,372	27,343	43,280	908	1,076,445	7,911	446	21,444	159,826	20,149	18,281	1,414
B. & O. . . .	91,594	170,691	6,481	27,058	39,200	55,044	882,463	8,604	635	11,309	278,705	18,721	7,029	18,000
Bengal	188,994	218,823	12,446	48,024	35,916	75,685	3,424,800	6,135	2,078	28,493	137,003	24,730	7,077	4,544
C. P. . . .	58,163	38,904	1,672	14,247	18,081	15	386,142	6,348	149	6,376	114,589	3,481	2,600	309
Bombay . . .	55,986	53,872	5,266	21,188	28,216	12	690,551	3,423	103	17,730	47,225	15,516	8,524	388
Madras . . .	207,207	307,217	14,344	103,118	107,019	6,024	1,050,146	55,665	1,221	31,850	619,391	41,171	18,728	131,258
Coorg . . .	7,220	5,478	85	311	168	2	98,760	1	...	1,708	1,983	120	57	3,463
Assam . . .	33,524	43,507	503	4,743	2,234	4,443	737,721	972	7	2,304	48,742	1,447	289	930
Burma . . .	30,931	31,269	1,350	23,140	31,652	61	399,817	3,755	61	5,457	75,352	6,291	1,628	1,152
Baluchistan	1,576	5,467	251	563	547	1	167,098	11	3	1,880	3,400	442	551	6

TABLE IX (viii).

	Classes I, III, IV.		Classes II, VI.		Class V.		Total.	
	1932.	1933.	1932.	1933.	1932.	1933.	1932.	1933.
British India	**2,319,879**	**2,322,673**	**119,298**	**116,211**	**181,119**	**145,638**	**2,620,296**	**2,584,522**
N.-W. F. P.	79,915	96,964	4,475	4,837	20,143	21,371	104,533	123,172
Punjab	540,736	541,160	28,836	28,244	4,677	5,452	574,299	574,856
Delhi	31,866	31,900	792	1,112	..	...	32,658	33,012
U. P	325,610	312,251	19,078	14,955	23,108	23,012	367,796	350,218
B. & O.	289,910	261,764	9,950	11,791	34,717	32,952	334,577	306,507
Bengal	154,911	163,263	14,580	12,967	23,620	22,987	193,111	199,217
C. P.	102,361	101,128	4,371	4,444	6,675	8,437	113,407	114,009
Bombay	145,751	135,144	15,048	15,348	43,321	5,474	204,120	155,966
Madras	489,242	511,853	15,449	15,582	23,020	23,628	527,711	551,063
Coorg	4,090	3,963	...	...	31	20	4,121	3,983
Assam	21,493	22,226	1,301	1,375	477	483	23,271	24,084
Burma	118,727	125,706	4,568	5,198	606	442	123,901	131,346
Baluchistan .	15,267	15,351	800	358	724	1,380	16,791	17,089

Tables IX (ix) and IX (x) give figures of income and expenditure for 1933. The expenditure on nursing staffs per in-patient treated amounts to Rs. 3-4-0 in British India as a whole and varied between Rs. 5-12-0 in Bengal and Bombay, Rs. 4-11-0 in Madras and Re. 0-6-0 in Assam ; that on diet was Rs. 2-13-0 and varied between Rs. 4-15-0 in Bengal, Rs. 4-11-0 in Madras, and Re. 0-8-0 in C. P.

TABLE IX (ix).

	Total income, classes I, III, IV.	Contributions by	
		Government.	Municipal and local fund.
	Rs.	Rs.	Rs.
British India . .	**4,14,09,026**	**1,80,53,769**	**1,37,99,231**
N. W. F. P. . . .	6,26,051	3,24,058	2,16,404
Punjab . . .	48,53,930	19,59,619	20,93,922
Delhi	7,66,170	2,96,148	3,17,592
U. P.	31,75,262	8,35,747	15,64,721
B. & O. . . .	32,39,058	8,52,925	15,42,636
Bengal . . .	70,22,635	21,34,895	23,63,520
C. P.	14,83,509	6,57,215	2,66,230
Bombay . . .	58,64,197	26,27,578	19,58,592
Madras . . .	80,93,321	56,34,789	18,21,900
Coorg	1,03,315	67,851	28,717
Assam . . .	9,30,757	4,11,208	3,01,899
Burma . . .	49,08,398	19,90,612	13,10,482
Baluchistan . . .	3,42,423	2,61,124	12,616

TABLE IX (x).

	Total expenditure.		Expenditure on			
	1932.	1933.	Medical officers.	Nurses.	Diet.	Medicines.
	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
British India .	**3,60,40,377**	**3,60,19,647**	**93,57,742**	**34,86,074**	**29,63,049**	**49,58,444**
N. W. F. P. .	6,45,163	**6,06,964**	1,66,554	37,330	32,414	92,608
Punjab . .	45,44,764	**39,34,851**	12,50,654	1,71,075	1,19,095	5,69,547
Delhi . .	6,12,593	**7,42,329**	1,02,767	1,38,551	41,609	1,07,672
U. P. . .	27,88,081	**28,28,434**	8,20,601	2,20,917	1,38,788	4,35,701
B. & O. . .	26,81,022	**26,61,222**	7,46,046	1,37,079	1,71,271	4,59,346
Bengal . .	54,68,541	**56,76,139**	11,15,008	6,44,297	5,50,887	8,02,751
C. P. .	11,43,811	**12,00,013**	4,12,641	91,594	18,689	1,74,815
Bombay . .	53,79,816	**54,55,672**	13,44,037	6,47,873	4,85,616	5,86,170
Madras . .	80,51,698	**79,97,182**	18,98,631	9,23,243	10,47,149	12,26,965
Coorg . .	1,00,638	**1,03,315**	32,147	9,039	10,255	21,306
Assam . .	7,75,428	**7,73,326**	3,17,853	6,488	42,366	1,21,554
Burma . .	35,84,812	**37,29,234**	10,59,292	4,37,953	2,92,243	3,27,759
Baluchistan .	2,64,010	**3,10,966**	91,511	20,635	12,667	32,240

North-West Frontier Province.

134. The number of hospitals and dispensaries increased by 9 due to the opening of a *Seva Samiti* dispensary at Bannu and 8 subsidised district dispensaries. Of the institutions included in classes I, III and IV, only 5 were female hospitals. Daily indoor attendances averaged 1,113 in classes I, III and IV; outdoor 9,425. The subsidised dispensaries treated 107,787 patients.

Diseases treated included malaria 627,024 cases, dysentery 23,173, enteric fever 1,290, gonococcal infection 1,731, syphilis 7,196, pneumonia 6,646 with 159 deaths, relapsing fever 20, leprosy 94, influenza 2,110, pyrexia of uncertain origin 13,207, tuberculosis of the lungs 3,669, other tubercular diseases 4,106, ankylostomiasis 661, roundworms 4,165, anaemia 25,833, diabetes 778, scurvy 147, malignant and non-malignant growths 1,443, eye diseases 240,187 and diseases of the digestive system 185,277. Normal labour cases numbered 422 and abnormal cases 197. Cases of opium poisoning totalled 21 and other poisons 96.

The scheme under which dispensary medical officers were required to visit the nearest villages was reported to be popular and a total of 107,787 patients were so treated as against 19,579 in 1932. The Indian Council of the B. E. L. R. A.* contributed Rs. 550 for anti-leprosy work.

Dental treatment was provided in the civil hospital, D. I. Khan, and 1,150 attendances, chiefly of schoolboys, were recorded.

Punjab.

135. Five new dispensaries were opened and 8 closed. Of the total number of institutions, 50 in urban areas belonged to class I; 98 in rural and 45 in urban areas to class II; 579 and 119 to class III; 11 and 19 to class IV; 4 and 4 to class V; and 26 and 18 to class VI. The number of rural dispensaries at work was 360 and of subsidised institutions 10. No further district and *tehsil* headquarters hospitals were provincialised. Daily indoor attendances at classes I, III and IV institutions averaged 6,966 and outdoor attendances 74,595; for institutions exclusively meant for women, the figures were 1,002 and 3,498, respectively. Of the 3,934 beds for females, 1,390 were available in the 44 women's hospitals included in classes I, III and IV and these treated 26,080 indoor and 457,197 outdoor patients. Arrangements for the treatment of women by women doctors are very inadequate and particularly so in the districts of Rohtak, Gurgaon, Hoshiarpur, Jullundur, Jhelum, Sargodha, Gujrat, Montogomery, Muzaffargarh and D. G. Khan. Twenty-four women doctors were employed by Government and 29 by local bodies. Five new appointments of women sub-assistant surgeons were created, but in 6 places no qualified woman doctor was available.

Diseases of the eye totalled 3,007,163 cases, malaria 3,062,837, diseases of digestive system 1,402,443, ulcerative inflammation 1,058,454, skin diseases 1,096.991, diseases of the ear 1,080,783, respiratory diseases excluding pneumonia and tuberculosis of the lungs 960,235, injuries 708,213, diseases of the stomach 563,518, intestinal diseases 526,115, diseases of the areolar tissue 230 034, diseases of nerves, spinal cord, brain and meningitis 256,978, diseases of the organs of locomotion 232,253, dysentery 193,143, enteric fever 21,626 gonococcal infection 13,472, syphilis 18,178, kala-azar 106, leprosy 631, relapsing fever 236, tuberculosis of the lungs 16,253, other tubercular disease 13,673,

* B. E. L. R. A.—British Empire Leprosy Relief Association.

ankylostoma 2,296, diabetes 2,504, scurvy 1,878, beri-beri 25 and malignant and non-malignant new growths 50,142. Labour cases totalled 11,499 with 150 deaths. Opium poisoning was the cause of 323 cases ; other poisons 3,593. Of 65,876 selected operations, 25,220 were for extraction of lens ; 2,495 were obstetric operations.

Patients' diets cost Rs. 1,50,936, medicines Rs. 6,33,966 and salaries of medical officers and nursing staffs Rs. 13,52,021 and Rs. 3,36,477, respectively. The corresponding figures for women's hospitals were Rs. 31,841, Rs. 64,419, Rs. 1,01,367 and Rs. 1,65,402, respectively. Details of expenditure on nursing staffs included :—

(*a*) *General hospitals.*

Baptist Mission Hospital, Palwal, Rs. 4,396 ; Ripon Hospital, Simla, Rs. 30,421 ; Walker Hospital, Simla, Rs. 11,369 ; Mayo Hospital, Lahore, Rs. 47,210 ; Civil Hospital, Amritsar, Rs. 20,450.

(*b*) *Female hospitals.*

Lady Reading Hospital, Simla, Rs. 33,929 ; Memorial Hospital, Ludhiana, Rs. 33,899, Mission Hospital, Amritsar, Rs. 92,270 ; Lady Aitchison Hospital, Lahore, Rs. 19,075 ; Lady Willingdon Hospital, Lahore, Rs. 25,654 ; St. Catherine's Hospital, Amritsar, Rs. 6,239 ; and Memorial Mission Hospital, Sialkot, Rs. 5,558.

Of 277 nurses employed only 4 worked in rural private-aided dispensaries and of 198 *dais* and midwives employed 65 were attached to rural dispensaries. 200 nurse *dais* and *dais* were employed in Government and local fund institutions. The Punjab Central Midwives Board continued to conduct examinations for the diploma in midwifery and for certificates for nurse *dais* and indigenous *dais*. No progress was made with the schemes for the establishment of a medical school for women at Lahore ; for providing separate well-equipped hospitals for women at district headquarters; for placing the women's sections of *tehsil* headquarters hospitals in charge of women sub-assistant surgeons ; and for attaching *dais* to other institutions.

In the Lady Willingdon Hospital, Lahore, with 56 beds, 1,945 inpatients and 592 maternity cases were treated and gynæcological and obstetric operations numbered 732. The Lady Aitchison Hospital, Lahore, with 100 beds is the only Government hospital in the province for the treatment of *purdah* women by women doctors. The Lady Hailey Women's Hospital, Bhiwani, continued its work.

The Punjab Dental Hospital, Lahore, a charitable institution, treated 23,501 cases. The anti-rabic treatment centre at the provincial bacteriological laboratory, Lahore, provided treatment for 4,760 cases and among these no deaths occurred.

Six medical graduates were appointed as honorary house surgeons and physicians.

Delhi.

136. The number of hospitals remained unchanged ; 3 of the 5 urban private-aided institutions were exclusively for women. The Delhi Municipal

Committee continued to maintain the Civil Dufferin Hospital and 8 branch dispensaries whilst 5 dispensaries were maintained by the District Board. The Willingdon Hospital, New Delhi, was extended to include a nursing home which dealt with 81 cases during the year.

Malaria accounted for 165,439 cases, influenza 119,560, dysentery 16,071, syphilis 7,299, gonococcal infection 6,976, enteric fever 1,118, leprosy 53, relapsing fever 23, smallpox 688, tuberculosis of the lungs 4,210 with 32 deaths, other tubercular disease 4,441 with 15 deaths, ankylostomiasis 59, roundworms 787, scurvy 238, beri-beri 41, diabetes 120 and rickets 250. 43 cases of opium poisoning and 656 of other poisons were treated. 1,649 maternity cases were attended with 26 deaths.

Nursing staffs were still inadequate although the number of nurses rose to 32 Europeans and Anglo-Indians and 96 Indians, including 4 in state public, 17 in local fund and municipal fund, 103 in private-aided and 4 in railway institutions.

U. P. of Agra and Oudh.

137. Twenty-nine rural and 13 urban institutions were opened ; 8 and 6 were closed ; and 20 and 1 were transferred to other departments and classes. The cadre of the provincial medical service totalled 101, whilst that of provincial subordinate medical service was 346, including a reserve of 15%. Government continued to grant subsidies for the building and maintenance of dispensaries to encourage private practitioners to settle in rural areas but with little success. Subsidised rural dispensaries as before numbered 35 ; 20 subsidised private practitioners worked in rural areas. The scheme of appointing women doctors and midwife compounders in rural areas was popular ; the provincialisation of headquarters hospitals made little progress. Female institutions of classes I, III and IV provided 1,558 beds. Malaria was, as usual, the chief cause of sickness, a total of 1,076,445 cases being treated. Other figures were dysentery 115,799, pyrexia of uncertain origin 159,826, rheumatic fever 121,080, influenza 66,197, syphilis 40,280, gonococcal infection 27,343, pneumonia 21,444, tuberculosis of the lungs 20,149, other tubercular diseases 18,281, enteric fever 6,372, leprosy 7,911, kala-azar 908, plague 898, relapsing fever 446, scurvy 333, and beri-beri 122. Labour cases numbered 9,053 with 319 deaths.

Surgical operations included 8,755 for cataract, 363 for simple hernia, 2,266 for removal of tumours, 786 cysts and 7,310 foreign bodies.

The King George's Hospital, Lucknow, spent Rs. 80,191 on the nursing staff ; the Ramsay Hospital, Nainital, Rs. 13,600 ; the European Civil Hospital, Allahabad, Rs. 8,433 ; Dufferin Hospital, Allahabad, Rs. 6,760 ; Bahrpur Mission Hospital, Farrukhabad, Rs. 6,509 ; Balrampur Hospital (European ward), Lucknow, Rs. 8,768 ; Dufferin Hospital, Lucknow, Rs. 5,359 ; St. Mary's Cottage Hospital, Dehra Dun, Rs. 6,958 ; Lady Lyall Hospital and dispensary and the maternity hospital, Agra, Rs. 14,878 ; and the D. A. P. Mission dispensary, Etah, Rs. 4,612.

Leprosy clinics were at work in nearly all the districts and the B. E. L. R. A. (Indian Council) have appointed a survey officer. The Shrimati Bhagwan Dai Leper Home was started in Cawnpore, the local Government contributing two-thirds of the recurring expenditure and the municipal board one-third. The leper asylum at Roorkee was closed. 994 cases of leprosy were treated at the

skin dispensaries at Cawnpore, Benares and Lucknow. Dental clinics were at work in Agra, Cawnpore, Jhansi, Dehra Dun, Lucknow, Balrampur Hospital and the King George's Hospital.

Bihar and Orissa.

138. Twelve institutions were opened and 2 closed in rural areas, whilst in urban areas the increase was one. Subsidised dispensaries remained unchanged ; the local and municipal fund dispensaries increased by three.

Numbers treated decreased by 160,833. Cholera and smallpox cases rose ; those of plague decreased. Malaria was responsible for 882,463 cases against 1,057,842 in 1932 ; influenza 91,584 ; venereal diseases 66,258 ; kala-azar 55,044 (55,344 in 1932) ; tuberculosis of the lungs 18,721. Other diseases treated included dysentery 110,691 cases, enteric fever 6,481, other tubercular diseases 7,029, ankylostomiasis 18,000, round-worms 81,365, scurvy 828, beri-beri 280, new growths, malignant and non-malignant, 11,518, diseases of the eye 469,773, diseases of the circulatory system 15,513, diseases of the stomach 163,922, intestinal diseases 167,123, diseases of digestive system 452,679 and skin diseases 993,121. Maternity cases numbered 6,572. 413 cases of opium poisoning and 6,858 of other poisons were treated. The special Government grant of Rs. 5,000 for the treatment of venereal diseases was continued ; that for kala-azar was increased to Rs. 10,000. 838 patients attended the Radium Institute, Patna, and 109 including 65 new tubercular cases were treated at Itki Sanatorium.

In addition to 1,256 female beds in the general hospitals and dispensaries (classes I, III and IV), 5 women's hospitals had accommodation for 205 cases. A total of 30,219 females (3,444 indoor and 26,775 outdoor) were treated.

Bengal (excluding Calcutta).

139. The number of medical institutions increased by 14 and, of the total, 695 hospitals and dispensaries were at work in rural and 529 in urban areas. In addition, several temporary rural dispensaries were established for special purposes.

A total of 9,807,418 cases were treated ; these included 9,307,196 in permanent institutions, 160,949 in the temporary rural dispensaries and 339,273 at the medical centres under the Public Health Department. 495,327 cases were treated in the 64 homeopathic, 15 *ayurvedic* and 5 *unani* dispensaries.

Malaria with 3,362,089 cases (2,726,313 in 1932) was as usual the chief cause of sickness. 70,312 patients attended for kala-azar, influenza 155,181, dysentery 201,537, smallpox 1,014, cholera 4,760, tuberculosis of the lungs 12,842, beri-beri 2,454, venereal diseases 69,281, (including 32,752 for gonorrhœa, 21,583 for syphilis and 14,946 for other venereal infections), 4,550 for leprosy, 10,010 for enteric fever, 2,037 for relapsing fever and 1,141 for ankylostomiasis.

The Jadabpore tuberculosis hospital treated 187 cases ; 821 indoor and 628 outdoor cases attended the leper hospitals at Gobra (Calcutta), Raniganj and Bankura.

Of the 109,811 persons operated on in classes I, III and IV institutions, 106,339 were cured, 2,632 relieved, 260 discharged, 270 died and 310 were

under treatment. Selected and other important operations totalled 8,280 including extractions of lens 1,631, bones 1,158, excision of tumours 956, abdominal sections, other than obstetrical. 674, obstetrical 576, hernia 308.

A total of 409 European and Anglo-Indian and 317 Indian nurses were employed; these included 353 and 200 in provincial headquarters hospitals; 50 and 108 in district headquarters and other urban institutions; 6 and 9 in rural dispensaries.

The civil surgeoncies were held by 11 I. M. S., 2 I. M. D. and 14 Bengal Medical Service Officers. There were also 739 medical officers at district headquarters and in other urban hospitals and 781 in rural dispensaries.

Calcutta.

140. Of 44 institutions open at the close of 1933, 21 treated out-patients only. The indoor accommodation in the other 23 institutions increased by 123 beds, including 100 in the Calcutta Medical Institute Hospital, 20 in the Carmichael Medical College Hospital and 3 in the Lady Dufferin Victoria Hospital.

Nursing staff in the Medical College hospitals was inadequate; except in the Presidency General Hospital, nursing arrangements were unsatisfactory.

An increase of 57,422 occurred in the number of patients treated during the year. Malaria accounted for 62,711 cases, kala-azar for 5,373, cholera 2,567, smallpox 1,661, influenza 33,813, tuberculosis of the lungs 11,888, other tubercular disease 3,442, venereal diseases 29,605 and beri-beri 1,624. The Campbell Hospital in Calcutta is the only institution where separate arrangements exist for the treatment of smallpox cases and 1,456 cases were admitted. In the diphtheria ward of the Medical College Hospital 310 cases were treated and of the 305 inpatients 101 or 33 % died. The Presidency General Hospital, the Campbell Hospital, the Mayo Hospital and the Sree Vishudhananda Saraswati Marwari Hospital also treated diphtheria cases.

Selected and other important operations numbered 10,907 and included abdominal operations excluding obstetrical 1,855, obstetrical 841; extraction of lens 1,823; bones 503; excision of tumours 427; amputations 134; hernia 526; elephantiasis of scrotum 196; and ovariotomy 62.

Government contributions formed 48 % of the total income of these institutions, local funds over 9 %, municipal funds 12 %, subscriptions and donations 13 %, and 18 % from other sources.

The Mental Observation Ward, Bhowanipur, provided 6 beds for Europeans and 24 for Indians. Of 79 cases under observation, 68 were new admissions and 3 readmissions. 32 were sent to the Ranchi Mental Hospital; 35 were released or discharged.

C. P. & Berar.

141. Five institutions were opened and 3 closed. Of the 164 rural dispensaries, 110 were maintained by local funds. Of the 229 state-public, local fund and private-aided hospitals and dispensaries, 11 of class IV were for females only.

Classes for probationer nurses were continued at the Mayo Hospital, Nagpur, and the Victoria Hospital, Jubbulpore, and proposals to start training

classes for nurses at the Irwin Hospital, Amraoti and the main hospital, Raipur, were sanctioned. Staff nurses continued to be employed at the main hospitals at Akola, Khandwa, Saugor and Wardha ; the nursing staffs and the numbers of probationer nurses at the provincialised hospitals at Nagpur, Jubbulpore, Raipur and Amraoti were augmented.

Of the total beds in classes I, III and IV institutions, 1,320 for males and 545 for females were provided in general hospitals and dispensaries, and 298 for females in the 11 women's hospitals. Patients totalled 3,378,498. Of the 2,907,469 patients treated in the state-public, local fund and private aided institutions, 2,825,721 attended the general hospitals and dispensaries and 81,748 attended the women's institutions. Malaria cases numbered 386,142 ; pyrexia of uncertain origin 114,589 ; dysentery 38,904 ; influenza 58,163 ; rheumatic fever 35,347 ; roundworms 25,813 ; syphilis 18,081 ; gonococcal infection 14,247 ; pneumonia 6,376 ; liver diseases 7,213 ; diseases of the stomach 85,281 : intestinal diseases 101,881 ; other diseases of digestive system 365,887 ; ulcerative inflammation 289,801 ; tuberculosis of the lungs 3,481 ; other tubercular disease 2,600 ; enteric fever 1,672 ; kala-azar 15 ; leprosy 6,348 and relapsing fever 149. Normal maternity cases numbered 4,832, with 13 deaths ; abnormal cases numbered 1,278, with 77 deaths. Of 237 smallpox cases, only 73 were vaccinated ; 74 were unvaccinated ; the vaccinal state of the others was not recorded. The treatment of venereal diseases in the branch dispensaries was reported to be unsatisfactory for lack of drugs and equipment.

Selected operations totalled 6,496 of which 820 were for cataract.

The expenditure on nursing staffs included (*i*) Mayo Hospital (Rs. 24,690) and Dufferin Hospital, Nagpur (Rs. 10,651), Victoria Hospital (Rs. 14,397) and Elgin Hospital, Jubbulpore (Rs. 3,692), Raipur Main Hospital (Rs. 4,116), Irwin Hospital, Amraoti (Rs. 2,671), and Dufferin Hospital, Amraoti (Rs. 3,585), Akola Female Dispensary (Rs. 3,961) and Akola Main Hospital (Rs. 1,612) and Sai Bai Female Hospital, Shegaon (Rs. 2,110).

Anti-rabic treatment was provided at Nagpur, Jubbulpore, Raipur, Hoshangabad and Akola and 1,655 cases were treated.

Bombay Presidency.

142. Only 2 dispensaries were opened and 1 was closed. 19 women's hospitals were at work; 8 in Bombay city, including 3 of class I and 5 of class III; one each of class III at Tatta (Karachi district), Tando Adam (Nawabshah district) and Sukkur ; 1 each of class IV at Poona, Surat, Ahmedabad, Hubli (Dharwar district), Karachi, Shikarpur, Sukkur and Larkana.

A total of 1,085,564 patients were treated at the state-public, local fund and private aided institutions in the Deccan, 763,983 in Sind, 695,274 in the Konkan, 616,716 in Gujerat and 48,781 elsewhere. The daily average number of in-patients was 4,807 and of out-patients 28,619. In the women's hospitals 115,517 patients were treated, 23,648 indoor and 91,869 outdoor ; the daily average indoor and outdoor attendances numbered 580 and 4, respectively.

Cases of malaria numbered 690,551, dysentery 53,872, syphilis 28,216, gonococcal infection 21,188, influenza 55,986, pneumonia, 17,730, pyrexia of uncertain origin 47,225, tuberculosis of the lungs 15,516, other tubercular disease 8,524, ankylostomiasis 388, roundworms 116,764, enteric fever 5,266,

kala-azar 12, leprosy 3,423, relapsing fever 103, scurvy 751, anæmia 28,048, diabetes 2,117, beri-beri 14 and rickets 4,933. Diseases of the eye numbered 356,207, those of the ear 181,932, nose 30,352, circulatory system 9,815, respiratory system 258,874, diseases of the stomach 127,457 and intestinal disease 145,379. Normal maternity cases numbered 25,468 with 48 deaths and abnormal cases 3,146 with 170 deaths.

Surgical operations included 1,233 for removal of tumours and cysts; 700 amputations; 5,091 on the eye including 2,137 for cataract; 1,238 for vesical calculi, 2,059 abdominal operations, 771 for hernia, 175 for liver abscess, lithotomy 189, obstetric operations 1,338; and 234 abdominal and 1,349 other operations for diseases peculiar to women.

Madras Presidency.

143. Twenty-nine new dispensaries were opened, 16 were closed and 12 were transferred to other classes (systems of medicine). 19 subsidised rural dispensaries were closed because of unsatisfactory progress. Government sanctioned a grant of nearly 15 lakhs for the remodelling scheme of the Government General Hospital and buildings connected with the Medical College, Madras, and in connection with the Government headquarters hospitals at Madura, Tanjore, Guntur, etc. The new X-ray and surgical blocks of the Government General Hospital and the new pathology block of the Medical College, Madras were completed.

In connection with the L. M. P. course the Surgeon General remarks :—

> "The L. M. P. of Madras may now be regarded as superior to those of other provinces. The end in view is to approximate the L. M. P of Madras to the London M. R. C. S. and L. R. C. P. examinations."

The Medical School, Tanjore, was closed. Due to financial stringency, specialised post-graduate training for medical officers was discontinued. 45 honorary medical officers were appointed. All districts were provided with medical lending libraries.

Daily indoor attendances in state-public, local fund and private-aided hospitals and dispensaries averaged 9,414 and outdoor attendances 105,329; the 39 female hospitals and dispensaries with 1,145 beds treated a total of 36,348 indoor and 570,624 outdoor patients. Diseases of the skin numbered 1,893,431, digestive system 1,806,285, respiratory system, excluding pneumonia and lung tubercle 1,258,816, ulcerative inflammation 1,226,257, diseases of the eye 1,139,691, ear 1,137,562, malaria 1,050,146, injuries 934,024 and intestinal disease 819,079. The principal diseases among in-patients were those of the generative system, the digestive system, the eye, malaria and injuries. Dysentery cases numbered 307,217, enteric fever 14,344, syphilis 107,019, gonococcal infection 103,118, kala-azar 6,024, leprosy 55,665, influenza 207,207, relapsing fever 1,221, pneumonia 31,850, tuberculosis of the lungs 41,171, other tubercular disease 18,728, beri-beri 21,335, diabetes 12,932 and scurvy 1,081. Opium poisoning cases numbered 772 with 12 deaths. Labour cases numbered 21,527 indoor and 60,495 outdoor, of which 72,747 were normal and 9,275 abnormal. The venereal department of the Government General Hospital, Madras, under a specialist continued to provide separate accommodation for indoor and outdoor cases and for males and

females but the majority of cases treated were out-patients. The cost of anti-rabic treatment was reduced from Rs. 10 to Rs. 6 per course.

The "group leprosy scheme" was extended for another 2 years. Of the 330 leprosy clinics, 134 were opened during 1933 and these were attended by 695,295 patients including 44,622 new cases. The scheme of anti-leprosy work started by Mrs. Todd was extended to the districts of South Arcot and Chingleput. Leprosy councils were formed in some districts.

Coorg.

144. Malaria was the chief cause of sickness, with 98,760 cases, influenza 7,569 cases, dysentery 5,478, pneumonia 1,708, pyrexia of uncertain origin 1,983, rheumatic fever 4,380, anæmia 3,793, gonococcal infection 311, syphilis 168, tuberculosis of the lungs 120 with 11 deaths, other tubercular disease 57 with 1 death, ankylostomiasis 3,463, leprosy 1, diseases of the eye 3,408, respiratory diseases 35,752, diseases of the stomach 2,359, intestinal diseases 5,336, liver diseases 1,134, other diseases of the digestive system 29,408, and skin diseases 24,744.

Assam.

145. In connection with the scheme for providing Shillong with an up-to-date civil hospital it was proposed to build 2 separate hospitals for men and women. Other important works included the construction of a self-contained female section at the Golaghat hospital and a dispensary at Doom Dooma.

In order to discourage the attendance at hospitals and dispensaries of those not really ill, the levy of an *anna* from non-indigent persons was more strictly enforced and the decreased numbers treated in the districts of Nowgong, Sylhet, Cachar and Khasi and Jaintia Hills were attributed to this fact. In Kamrup, Goalpara, Sibsagar and Darrang large increases were reported due to the greater prevalence of malaria in the rural areas; attendances increased also in Lushai and Garo Hills, Lakhimpur and Manipur State.

Malaria cases totalled 737,721, skin diseases 373,255 (including 260 cases of yaws), respiratory diseases excluding tuberculosis and pneumonia 162,131, diseases of the digestive system 145,442, roundworm 136,043, ulcerative inflammation 97,433, eye diseases 108,387, injuries 89,934, diseases of the organs of locomotion 82,580, diseases of the stomach 75,095, pyrexia of uncertain origin 48,742, dysentery (mainly bacillary) 43,507, influenza 33,524, rheumatic fever 11,466, anæmia 11,934, gonococcal infection 4,743, syphilis 2,234, kala-azar 4,443, pneumonia 2,304, tuberculosis of the lungs 1,447, other tubercular disease 289, ankylostomiasis 930, enteric fever 503 and leprosy 972. One case of opium poisoning and 693 of other poisons were recorded. 852 labour cases with 14 deaths were attended. Most of the dysentery cases were recorded in the districts of Sylhet, Goalpara, Kamrup and Cachar. The incidence of dysentery was reported to be less in those districts where bacteriophage was distributed. The anti-syphilitic campaign in the Naga and Lushai Hills was continued, 59 and 33 cases, respectively, being treated. The question of prevention of tuberculosis received attention. Leprosy out-patient clinics were at work at all *sadr*, sub-divisional headquarters and the more important outlying dispensaries. Details of the work done at the leper asylum at Sylhet, the leper hospital at Kohima, the leper ward at Dhubri and the leper colony at Tura will be found in section II of this report (page 87). The

Municipal Board, Gauhati, built a leper asylum to provide for 20 inpatients and the American Baptist Foreign Missionary Society have established a leper colony at Jorhat. Leprosy surveys were directed by civil surgeons in five districts. The Assam Leprosy Relief Committee assisted in the maintenance of Public Health Department dispensaries treating leprous cases and in the erection of leprosy treatment sheds in civil hospitals and local fund dispensaries. Two assistant surgeons of the Public Health Department received training in the technique of leprosy treatment at the Calcutta School of Tropical Medicine and many others were given similar training under previously trained medical officers.

As regards nursing services, 3 trained sisters of charity were appointed in the Dibrugarh civil hospital; 2 were at work in the Gauhati civil hospital and 1 in Nowgong. Six selected women were under training at Calcutta and Delhi.

An interesting series of experiments was carried out by certain civil surgeons in the treatment of drug addicts by Modino's detoxication method; the results in some cases were reported to be good.

Burma.

146. Eight hospitals were opened and 4 were closed. Only 5 institutions of classes I, III and IV treat women exclusively, 3 in Rangoon, 1 each in Bassein and Mandalay. Of these, the Dufferin Hospital, Rangoon, with 132 beds treated in-patients only.

The sanctioned cadre of Indian Medical Service officers totalled 38, I. M. D. officers 10, private medical practitioners holding civil surgeoncies 4, civil assistant surgeons 69, sub-assistant surgeons 409 and subsidised medical practitioners 5. The allocation of civil surgeoncies was revised: I. M. S. officers 19, I. M. D. 7, and civil assistant surgeons 12. The proposal to appoint private medical practitioners as honorary members of the staff of Government hospitals was sanctioned; that of employing graduates and licentiates as house surgeons and physicians or assistants in Government hospitals was placed on a permanent footing; 16 graduates and 10 licentiates were employed during the year. The number of nursing sisters employed at the end of the year was 31; of trained nurses and midwives 504, of whom 135 were Europeans and Anglo-Indians and 208 Burmese; 161 midwives worked in hospitals. Almost all the hospitals in the province employ at least 1 nurse or midwife, but in most cases the number is inadequate.

Malaria cases numbered 399,817, or nearly 12 % of the total, digestive diseases 335,515, respiratory diseases 274,080, skin diseases 269,962, injuries 259,385, ulcerative inflammation 233,021, roundworms 210,952, intestinal disease 210,087, eyes 162,876, ear 131,313 and stomach 114,999. Dysentery accounted for 31,269 cases, enteric fever 1,350 with 171 deaths, gonococcal infection 23,140, syphilis 31,652, kala-azar 61, leprosy 3,755, influenza 30,931, relapsing fever 61, pneumonia 5,457, pyrexia of uncertain origin 75,352, tuberculosis of the lungs 6,291, other tubercular diseases 1,628, ankylostomiasis 1,152, roundworms 210,952, diabetes 941, scurvy 51 and beriberi 1,557. Maternity cases numbered 13,089 of which 177 died.

The quinine alkaline method of treatment of malaria was brought into general use. Owing to financial stringency, no new venereal clinics were

opened. The leper hospitals at Rangoon, Moulmein and Mandalay continued to work. Leprosy clinics were started at dispensaries in the districts of Meiktila and Minbu. Travelling dispensaries continued to treat cases of yaws in the districts of Katha, Tavoy and Mergui.

As regards medical education, the most noteworthy feature was the appointment on a permanent basis of a lecturer in pathology in the Medical School, Rangoon, and the inclusion of this subject in Part I of the final examination. The question of lengthening the curriculum to 5 years and of improving the status and prospects of medical licentiates was under consideration of Government.

Expenditure on nursing staffs in the Rangoon General Hospital amounted to Rs. 1,85,416; in the contagious diseases hospital, Rangoon, Rs. 17,470; in Akyab Rs. 15,059; Syriam Rs. 12,369; Bassein Rs. 13,155; Moulmein Rs. 10,357; Mandalay Rs. 53,562 and Maymyo Rs. 21,746.

Baluchistan.

147. In addition to a "Residency Surgeon and Chief Medical Officer", who was in charge of the medical administration, 5 I. M. S. officers were employed as civil surgeons at Quetta, Sibi, Chaman, Loralai and Fort Sandeman. The supervision of the railway institutions was entrusted to a district medical officer appointed by the Railway Department.

Of the total hospitals and dispensaries 31 were state-public, 2 state-special, 1 local fund, 3 Dufferin Fund, 4 private non-aided and 8 railway dispensaries. In addition, there were 2 Mission hospitals in Quetta and 2 temporary Mission dispensaries at Mastung and Dhadar for summer and winter, respectively. Malaria cases numbered 167,098, diseases of the digestive system 120,120, diseases of the eye 74,666, ulcerative inflammation 82,226, respiratory diseases 54,798, skin diseases 20,824, diseases of areolar tissue 20,679, diseases of the ear, 21,263, diseases of stomach 21,542, intestinal diseases 21,236 and diseases of the circulatory system 347. Infectious diseases included dysentery 5,467, enteric fever 251, gonorrhœa 563, syphilis 547, leprosy 11, kala-azar 1, relapsing fever 3, influenza 1,576, tuberculosis of lungs 442, other tubercular disease 551 and ankylostoma 6. 7,977 cases were treated for anæmia, 34 for diabetes, 788 for scurvy, 1 for beri-beri, 30 for rickets, whilst those for malignant and non-malignant new-growths totalled 133; for opium poisoning 11; for other poisons 285. 404 maternity cases were given hospital treatment. Anti-rabic treatment was given to 27 persons in the civil hospital, Quetta. Only 1 death occurred after completion of treatment.

The Quetta isolation hospital admitted 51 cases of infectious disease, including 29 smallpox, 8 chicken-pox, 6 leprosy and erysipelas each and 2 measles.

Aden.

148. Eight hospitals and dispensaries were at work and these included 1 private non-aided institution in rural areas, *viz.* His Highness the Sultan's Dispensary, Lahej, and 7 in urban areas. The total strength of the medical staff included 1 medical officer in rural and 16 officers in urban areas.

In the European General Hospital, the medical and nursing staffs consisted of a resident medical officer, a military assistant surgeon, 3 subordinate medical officers, 1 matron and 3 nursing sisters who in addition possess midwifery

qualifications. The patients treated were mainly seamen, British and foreign, and totalled 121 indoor and 2,500 outdoor cases.

Diseases of the digestive system and chronic ulcers were the chief causes of illness. Dysentery was responsible for 18, diseases of the nerves, spinal cord, brain and meningitis 83, eye 108, ear 85, nose 66, respiratory diseases 58, diseases of stomach 30, intestinal disease 44, digestive diseases 403, ulcerative inflammation 157 and injuries 1,033.

The civil hospital had a staff of one Bombay medical service officer, 1 woman doctor, 3 subordinate service medical officers, 1 nurse and 1 midwife. A total of 13,556 patients attended, indoor 1,427 and outdoor 12,129. Cases included dysentery 61, enteric fever 11, gonococcal infection 113, syphilis 84, leprosy 9, malaria 745, influenza 265, pneumonia 101, pyrexia of uncertain origin 69, tuberculosis of the lungs 153, other tubercular disease 110, diseases of the stomach 300, intestinal disease 281, digestive diseases 1,731, and diseases of the generative system 503. Surgical operations totalled 1,031.

B.—Indian States.

149. *Burma (Federated Shan States).*—A total of 24 state-public and 3 private aided dispensaries provided 636 beds, 486 for males and 150 for females. Six of the state-public institutions treated out-patients only. A total of 309,715 cases were treated including 12,269 indoor and 297,446 outdoor.

Total income and expenditure amounted to Rs. 2,14,357 and Rs. 1,93,028, respectively. Salaries of medical officers cost Rs. 59,702, nursing staffs Rs. 14,831, patients' diets Rs. 22,249 and medicines Rs. 23,235.

Mysore State.—Of the 280 hospitals and dispensaries, 28 were state-public, 14 state special, 221 local and municipal fund, 6 private aided, 4 private non-aided and 7 railway institutions. Available beds numbered 2,055 (920 for males and 1,135 for females) including 841 for males and 1,015 for females in classes I, III and IV dispensaries.

Patients treated in classes I, III and IV institutions totalled 4,013,135 (39,210 indoor and 3,973,925 outdoor). Malaria cases were 860,822, enteric fever 3,457, dysentery 75,649, gonorrhœa 13,687, syphilis 16,966, ankylostomiasis 14,574, leprosy 284, plague 2,338, pneumonia 9,868, pyrexia of uncertain origin 214,725, tubercular disease 7,715, diabetes 1,854 and scurvy 656. Labour cases numbered 7,018 with 89 deaths. The *unani* and *ayurvedic* dispensaries treated 1,166,394 patients. Surgical operations totalled 84,486.

The 280 midwives attended 22,351 maternity cases or 79 cases each. Maternity hospitals were at work at Bangalore, Mysore and the Kolar Gold Fields.

The Princess Krishnajammanni Tuberculosis Sanatorium, Mysore, admitted 246 patients; of these 174 were relieved, 23 died and 49 were discharged otherwise. The epidemic diseases hospitals at Bangalore, Kolar Gold Fields and Mysore treated 1,200 cases and reported 522 cures and 354 deaths. Admissions to the leper asylum, Bangalore, totalled 118, whilst the out-patient dispensary continued its useful work. The leprosy survey of Bangalore and Goribidnur taluks was completed and that of Mandya and Maddur taluks was in progress.

Total income was Rs. 14,31,602 and total expenditure Rs. 14,31,752; salaries cost Rs. 9,18,298; medicines Rs. 1,46,244; and patients' diets Rs. 1,49,505.

Hyderabad State (*Fasli* year 1341).—132 Government, 7 aided by local funds, 5 *Sarfi-Khas* and 2 *Shahi* aided hospitals and dispensaries were at work. The patients treated totalled 1,864,262—in-patients 23,136 and out-patients 1,841,126. 1,748 beds were available, including 887 in Hyderabad city and 861 in the districts; 1,108 were for males and 640 for females. The daily average attendances were 966 indoor and 12,098 outdoor. Of the total, the Osmania Hospital, Hyderabad, treated 121,279 cases and the Suburban Hospital 53,388. Diseases of the digestive system numbered 333,757, malaria 273,853, ulcers 127,120, diseases of the ear 128,742, respiratory system 155,891, eye 119,077, dysentery 27,249, venereal diseases 22,987, influenza 21,540, tubercular disease 5,547, pneumonia 3,296 and plague 143.

The Victoria *Zenana* Hospital, Hyderabad, and the Rani Sarnapalli Hospital at Gulbarga are the only institutions which treat women patients exclusively. Qualified women doctors were employed in 8 hospitals in Hyderabad city and in 16 headquarters hospitals in districts. In addition, outdoor medical relief was provided at all Government hospitals and dispensaries and a total of 11,047 indoor and 633,663 outdoor women patients sought treatment at these institutions. 3,910 maternity cases were attended—2,426 in and 1,484 outside the hospitals.

Surgical operations numbered 65,463.

Anti-rabic treatment was provided at the Government Chemical and Bacteriological Laboratory in Hyderabad city and at 4 district headquarters hospitals. A total of 357 cases were treated.

Medical staff included 29 civil surgeons, 1 special plague officer, 1 chief malaria officer, a woman civil surgeon in the Victoria *Zenana* Hospital, 71 assistant surgeons and 171 sub-assistant surgeons. The nursing staff comprised 108 posts, including matrons 2, assistant matron 1, British Sisters 2 and Indian Sisters 10. Training classes for hospital nurses were held as usual in the Osmania and Victoria *Zenana* Hospitals.

II.—Mental Hospitals.

150. The 19 mental hospitals in British India provided accommodation for 9,624 patients. In addition, the mental observation ward, Bhowanipur (Calcutta) provided 30 beds—6 for Europeans and 24 for Indians and the mental ward of the Albert Victor Hospital, Gobra (Calcutta), for the treatment of leprosy had 10 beds, of which 8 were for males and 2 for females; but these institutions are excluded from the statistics dealt with in this paragraph. So far as information is available, among Indian States mental hospitals exist in Indore and Bangalore (Mysore State). In Hyderabad State, the asylum for treating mental cases forms part of the central jail at Hyderabad and proposals for the construction of an up-to-date mental hospital were under consideration.

European patients from the Punjab, U. P., B. & O., the C. P., Bengal and Assam are sent to the Ranchi Mental Hospital and the Indian Mental Hospital, Kanke, continued to treat Indian patients from Bengal and B. & O. European cases in the Bombay Presidency are treated in a section of the Central Mental Hospital, Yeravda, which provides 222 beds—137 for males and 85 for females; those in the Madras Presidency are housed in the Madras Mental Hospital with an accommodation of 155 beds, males 85 and females 70.

The Indian Lunacy Act, 1912, as amended by Act VI of 1922, Acts XI, XXXII and XXXIII of 1923, Act V of 1926 and Act X of 1927, is the only legislative measure in force.

The maximum number confined on any one night in the 19 institutions in British India was in excess of the available accommodation in Madras (+580), Bombay (+270), Burma (+216), Punjab (+101), B. & O. (+18), and C. P. (+7). Table IX (xi) gives the location of the 19 mental hospitals, the accommodation available, the maximum population confined and space per patient.

TABLE IX (xi).

	Number.	Accommodation.			Maximum confined.			Sq. ft. per head.
		M.	F.	Total.	M.	F.	Total.	
British India	19	**7,344**	**2,280**	**9,624**	**8,323**	**2,410**	**10.733**	—
Punjab	1	826	182	1,008	884	225	1,109	70
U. P.	3	1,294	429	1,723	1,280	366	1,646	50
B. & O.	2	1,120	372	1,492	1,166	344	1,510	30 Eurpn. 50 Indn.
C. P.	1	344	126	470	373	104	477	54
Bombay	6	1,273	628	1,901	1,509	662	2,171	50—140
Madras	3	894	254	1,148	1,319	409	1,728	16—50
Assam	1	566	124	690	571	113	684	50
Burma	2	1,027	165	1,192	1,221	187	1,408	87

151. Table IX (xii) gives the admissions, total population, daily average strength, daily average sick, cures and deaths.

TABLE IX (xii).

	Admitted.	Population.			Cured.	Died.	Average Strength.	Average sick.	Criminal insanes.
		M.	F.	Total.					
British India	**3,283**	**10,368**	**2,955**	**13,323**	**1,353**	**679**	**10,300**	**851**	**2,382**
Punjab	468	1,167	305	1,472	175	72	1,057	63	244
U. P.	434	1,584	421	2,005	238	114	1,590	174	79
B. & O.	198	1,293	388	1,681	95	35	1,490	72	522
C. P.	123	438	119	557	48	25	454	22	143
Bombay	878	2,041	854	2,895	383	216	2,045	114	176
Madras	664	1,738	523	2,261	225	116	1,665	294	266
Assam	153	657	124	781	70	22	648	71	276
Burma	365	1,450	221	1,671	119	79	1,351	41	676

152. Principal types of insanity treated are given in Table IX (xiii). Mania melancholia and dementia are most common in India.

TABLE IX (xiii).

	Punjab.	U. P.	B. & O.	C. P.	Bombay.	Madras.	Assam.	Burma.	Total.
Total	**1,472**	**2,005**	**1,681**	**557**	**2,895**	**2,255**	**781**	**1,671**	**13,317**
Idiocy	56	88	18	13	49	45	2	19	290
Imbecility	62	94	71	39	155	131	5	67	624
Mania	566	714	287	247	898	476	340	507	4,035
Melancholia	99	269	186	105	551	127	247	354	1,932
Insanity (circular alternating)	44	23	112	4	233	112	...	21	549
Stupor	5	27	11	1	20	26	...	17	107
Delusional insanity	21	98	116	21	126	93	17	47	539
Acute delirium	1	1	7	...	2	3	...	...	14
Confusional insanity	43	136	51	7	46	46	...	89	418
Syphilitic insanity	1	32	7	2	10	40	2	96	190
Insanity alcoholic	8	19	39	3	29	73	...	27	198
Insanity *Cannabis Indica*	73	287	118	7	121	146	75	21	848
Dementia præcox	168	74	309	59	324	647	83	260	1,924
Dementia primary or secondary	280	73	181	17	216	219	3	74	1,063
Other types	45	70	174	32	115	71	7	72	586

Details of the main aetiological factors are given in Table IX (xiv). In many cases the causes of insanity were more than one.

TABLE IX (xiv), excluding cases under observation.

	Punjab.	U. P.	B. & O.	C. P.	Bombay.	Madras.	Assam.	Burma.	Total.
Total	**512**	**438**	**346**	**252**	**937**	**1,292**	**179**	**433**	**4,389**
Heredity	13	12	30	13	133	114	20	19	**354**
Mental instability	149	37	38	41	93	142	...	40	**540**
Deprivation of special senses	...	1	...	1	...	1	...	...	**3**
Critical periods	1	56	1	15	86	23	...	43	**225**
Child-bearing	9	5	2	2	34	6	2	...	**60**
Mental stress	74	20	48	75	129	258	6	28	**638**
Disorders of nutrition or metabolism	...	12	5	4	113	98	...	45	**277**
Infective and toxic	124	155	54	9	158	156	37	94	**787**
Traumatic	1	2	...	2	7	3	...	4	**19**
Nervous diseases	42	11	14	7	30	64	10	7	**185**
Other afflictions	...	48	...	5	10	62	...	19	**144**
No cause assignable	10	9	...	...	43	22	104	...	**188**
No cause ascertained	89	70	154	78	101	343	...	134	**969**

153. Tables IX (xv) and IX (xvi) give details of the 3,266 admissions by age groups and religions. 69 % were between 20 and 40 years of age; nearly 60 % were Hindus and 22 % Muhammedans.

TABLE IX (xv).

	Under 20 years.		20—40 years.		40—60 years.		Over 60 years.		Total.	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
British India	**203**	**77**	**1,843**	**407**	**535**	**162**	**30**	**9**	**2,611**	**655**
Punjab	45	19	257	47	76	18	5	1	**383**	**85**
U. P.	20	4	286	50	53	17	2	2	**361**	**73**
B. & O.	13	2	100	25	38	16	2	2	**153**	**45**
C. P.	8	1	80	15	15	4	...	...	**103**	**20**
Bombay	56	26	462	133	131	59	8	3	**657**	**221**
Madras	30	20	364	91	111	31	7	1	**512**	**143**
Assam	8	1	98	14	19	4	1	...	**126**	**19**
Burma	23	4	196	32	92	13	5	...	**316**	**49**

TABLE IX (xvi).

	Hindus.		Muhammedans.		Christians and Europeans.		Others.		Total.	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
British India	**1,548**	**401**	**638**	**85**	**197**	**120**	**228**	**49**	**2,611**	**655**
Punjab	179	51	184	20	6	10	14	4	**383**	**85**
U. P.	259	54	97	13	5	6	...	...	**361**	**73**
B. & O.	80	20	29	3	44	22	...	...	**153**	**45**
C. P.	83	17	18	2	2	1	...	...	**103**	**20**
Bombay	432	142	150	28	56	38	19	13	**657**	**221**
Madras	344	96	99	12	65	33	4	2	**512**	**143**
Assam	104	11	12	5	2	3	8	...	**126**	**19**
Burma	67	10	49	2	17	7	183	30	**316**	**49**

154. In *Bombay Presidency*, the death rate was 10·5 *p. m.* and the chief causes of death were dysentery 28, malaria 24, diseases of digestive system 22, nervous diseases 16, tuberculosis 15, pneumonia 14, diarrhœa 13 and other

causes 84. The Naupada mental hospital again reported the highest death rate of 27 *p. m.* In *Central Provinces*, pneumonia was the cause of 1 death, other tubercular infection 2, heart failure 1, acute mania 3, epilepsy 4, colitis 5, dysentery 4, enteritis 1, pyelo-nephritis 1, pyaemia 1, acute infective gangrene 1 and anæmia 1. Anti-cholera and smallpox measures were continued. Over 11 % of the new admissions were found to be infected with hookworm. In *Assam*, of the 245 admissions to hospital, 58 were for dysentery, 44 for malaria, 24 for influenza, 13 for diarrhœa, 11 for tuberculosis, and 95 for other causes. 7 % of inmates were admitted in good, 54 % in indifferent and 39 % in bad health. The chief causes of death were tuberculosis 10 and dysentery 4. Bilivaccine was tried with encouraging results and special accommodation was provided for segregation of tubercular cases. In *Madras Presidency*, the death rate was 7 *p. m.* In the Madras mental hospital the gradual increase in tuberculosis incidence is ascribed chiefly to overcrowding and to want of proper segregation. 88 deaths were recorded in the Madras Mental Hospital, 8 in Waltair and 20 in Calicut. Admissions to hospital totalled 2,056 of which 1,608 were in Madras alone, 414 in Calicut and 34 in Waltair and included diseases of the nervous system 625, anæmia and debility 243, dysentery 175, tubercular diseases 86, malaria 22, influenza 77, enteric 5 and cancer 3. In the Indian Mental Hospital, Kanke (*B. & O.*), 28 deaths were recorded which included tuberculosis of lungs 5, diseases of the circulatory system, pneumonia, nervous diseases 3 each, dysentery, diseases of the stomach and intestines 2 each. Seven deaths occurred in the European Mental Hospital, Ranchi, 5 were ascribed to heart failure, 1 each to pneumonia and smallpox. The chief causes of death in the *Punjab* Mental Hospital were pneumonia 24, tuberculosis 9, dysentery 7, ankylostomiasis 6, anæmia and debility 5, *status epilepticus* 4 and other causes 17. The number of deaths in the *U. P.* decreased to 114, as, in common with other provinces, the year under review was a particularly healthy one. In *Burma*, a total of 78 deaths was recorded at the Tadagale Mental Hospital and only 1 at Minbu. The increased mortality was ascribed to the admission of many advanced cases of general paralysis of the insane, 14 of whom died within a few months of admission. The more important causes of death were general paralysis of the insane 25, and tuberculosis of the lungs 19. A mild outbreak of influenza occurred at Tadagale and was responsible for 42 cases of sickness.

155. Treatment continued to be provided as reported in previous reports.

156. Table IX (xvii) gives provincial expenditure on the maintenance and upkeep of mental institutions.

TABLE IX (xvii).

	Total.	Diet.	Bedding and clothing.	Medicines.
	Rs.	Rs.	Rs.	Rs.
British India	**36,28,537**	**9,08,410**	**1,28,251**	**10,539**
Punjab	5,17,988	86,220	17,995	751
U. P.	2,41,644	67,637	9,523	1,029
Bihar and Orissa—				
European	3,91,610	74,787	13,751	3,833
Indian	5,07,585	1,59,438	26,664	1,316
C. P.	96,509	32,444	4,294	45
Bombay	7,43,426	1,92,036	39,937	1,506
Madras	5,06,292	1,85,512	8,066	1,426
Assam	1,16,993	40,986	4,979	211
Burma	5,06,490	69,350	3,042	422

III. Medical Colleges.

Punjab.

157. *King Edward Medical College, Lahore.*—The total number on the rolls was 463. Eight students received scholarships from the Punjab Government, 5 from the North-West Frontier Province Government and 40 from non-Government sources.

University Examination Results.

		Appeared.	Passed.
M. B., B. S.:—			
1st	May, 1933	101	57
	October, 1933	51	24
2nd	May, 1933	68	50
	October, 1933	23	13
3rd	April, 1933	76	63
	October, 1933	14	14
Final	April, 1933	36	24
	October, 1933	76	40
Post-graduates (assistant surgeons)		4	4

Delhi.

158. *Lady Hardinge Medical College for Women, New Delhi.*—The session began with 145 resident students.

University Examination Results.

		Appeared.	Passed.
Intermediate Science		22	18
M. B., B. S.:—			
1st		22	12
2nd		22	13
3rd		15	14
Final	Part A.	14	12
	Part B.	14	10

United Provinces.

159. *King George's Medical College, Lucknow.*—249 students were on the rolls.

University Examination Results.

		Appeared.	Passed.
M.B., B. S.:—			
1st		63	45
Final Part I	Group A	48	38
	Group B.	67	44
Final Part II		81	47
D. P. H. Part II		2	2
M. D.		3	2
M. S.		3	1

Bihar and Orissa.

160. *Prince of Wales' Medical College, Patna.*—The number of students on the rolls was 275.

University Examination Results.

M. B., B. S.:—		Appeared.	Passed.
2nd	Part I September, 1933	20	14
	Part II September, 1933	19	9
Final	Part I September, 1933	37	22
	Part II September, 1933	29	14
1st	December, 1933	34	21
	Supplementary April, 1934	17	14
2nd	Part I April, 1934	39	16
	Part II April, 1934	41	20
Final	Part I April, 1934	41	23
	Part II April, 1934	44	17

Bengal Presidency.

161. (*a*) *Medical College, Calcutta.*—A total of 751 students including 49 military and 19 female students were on the rolls.

University Examination Results.

M. B., B. S.:—	Appeared.		Passed.	
	M.	F.	M.	F.
Preliminary Science	132*	5	110†	5
1st	113	4	78	4
2nd	97	..	70	..
3rd	97	1	77	1
Final	226	4	69	3

Membership Medical Faculty :—

	Appeared.		Passed.	
	Civil.	Military.	Civil.	Military.
Preliminary Science	..	8	..	6
1st (new Regulations)	7	..	4	..
2nd (new Regulations)	3	..	1	..
3rd (new Regulations)	2	..	1	..
Final (new Regulations)	19	..	6	..
Intermediate (old Regulations)	..	15	..	11
Final (Part I)	3	10	2	8
Final (Part II)	3	8	2	6

* Includes 6 military students.
† Includes 4 military students.

(*b*) *Carmichael Medical College, Belgachia.*—645 students were on the rolls

University Examination Results.

	Appeared.	Passed.
M. B.:—		
Preliminary Science	155	109
1st	144	84
2nd	118	65
3rd	104	78
Final	179	58
State Medical Faculty :—		
Intermediate Membership	1	1
Final Membership	13	7

No candidate appeared for the preliminary membership examination.

Bombay Presidency.

162. (*a*) *Grant Medical College, Bombay.*—The total number of regular students on the rolls at the end of the year was 607 of whom 79 were women. No military students were under training.

University Examination Results.

		Appeared.	Passed. F.	Passed. M.
M. B., B. S.:—				
1st Examination	April	80	4	41
	December	173	11	71
2nd Examination	April	65	7	32
	December	84	6	36
3rd Examination	Group A—			
	April	90	2	30
	December	106	11	36
	Group B—			
	April	94	1	40
	December	105	6	38

(*b*) *Seth Gordhandas Sunderdas Medical College, Bombay.*—The regular students on the rolls numbered 372. This total included 25 women students and 70 new admissions.

M. B., B. S.:—		
First	1st year	70
	2nd year	55
Second—3rd year		65
Third	4th year	93
	5th year	79
B. Sc.		1
Post-graduates		11
	Total	374

University Examination Results.

	Appeared.		Passed.		Passed part only.	
	April 1933.	Dec. 1933.	April 1933.	Dec. 1933.	April 1933.	Dec. 1933.
1st M. B., B. S.	42	64	28	37	..	..
2nd M. B., B. S.	46	55	23	31	..	..
3rd M. B., B. S.	50	67	14	14	18	16

One candidate appeared for the B.Sc. in physiology, but he was not successful. Eight appeared for the M.D. degree and 2 only passed. Four candidates appeared for the M. S. degree and one passed. This year only one appeared for the diploma in ophthalmology and he was successful.

Madras Presidency.

163. (*a*) *Medical College, Madras.*—774 students were on the rolls.

	M.	F.	Total.
M. B., B. S.	505	75	580
L. M. S.	8	..	8
Military medical students	68	..	68
L. M. Ps. qualifying for M. B., B. S. degree	15	..	15
Chemists and Druggists	6	..	6
Public Health Diploma	7	..	7
Sanitary inspectors	90	..	90
Total	699	75	774

University Examination Results.

	Appeared.	Passed.
L. M. S.—		
2nd	1	1
3rd	1	..
Final Part II	11	3
M. B., B. S.:—		
1st (new Regulations Part II)	204	100
2nd Part II	143	85
Final Part II	174	44

Of the military medical students, 4 were in the final year ; 3 appeared for the Board examination in April 1934 and passed while the remaining one appeared for the final M.B., B. S. degree in April 1934 but failed.

(*b*) *Medical College, Vizagapatam.*—219 students were on the rolls at the beginning of the academical year, 50 being new admissions, but the number at the end of the year was reduced to 213. This variation was due to the results of the University examinations and to the withdrawal of passed candidates.

This college is affiliated to the Andhra University. Examinations in medicine of the Andhra University, however, were previously held conjointly with the Madras University. From April 1934 the Andhra University authorities have held their own examinations at Vizagapatam except the practical examinations in the clinical subjects of the final M. B., B. S. which are held at Madras.

University Examination Results.

		Appeared.	Passed.
Pre-registration		99	39
M. B., B. S.:—			
First	Part I	49	31
	Part II	44	18
Second	Part I	32	25
	Part II	39	23
Final	Part I	17	16
	Part II	40	16

Medical Research.

164. The following brief paragraphs indicate the activities of various college departments in the field of medical research.

Medical College, Lahore.—Various departments carried out investigations including (*a*) cirrhosis of the liver in the Punjab; (*b*) urobilinuria and its importance in malaria; (*c*) malignant disease in the Punjab; (*d*) the action of acetyl-choline, etc., on rabbit's gut and uterus and its synergism with physo-stigmine; (*e*) pharmacology of mitragynine; (*f*) the effect of mitragynine on man; (*g*) the vitamin A content of *ghee*; (*h*) therapeutic action of digitalis and quinidine in heart diseases; and (*i*) the rôle of bromides and ketogenic diet in the treatment of epilepsy, kala-azar and lobar pneumonia, etc.

Prince of Wales' Medical College, Patna.—The Pharmacological department investigated certain indigenous drugs and synthetic preparations but was considerably handicapped for want of a wholetime chemist. These drugs included *Rauwolfia serpentina*, its action on the heart, blood vessels and intestines; *Thevetia neriifolia*, and *Abrus precatorious*; pharmacological action of *the vetoxine and abrine*. Six papers were published by this department. The Physiology department carried out research work with special reference to diabetes and heart hormone. Eight papers were published and one was under publication. The Anatomy department studied certain abnormalities of structures in human bodies while the Organic Chemistry department continued its researches on vitamins. A paper on "Vitamin contents of Rice Water" was published by the latter department. The Biological department published a paper on the inheritance of disease in the Patna Journal of Medicine. The Pathological department published three papers on (*a*) "A rare helminthic (*Gastrodiscus*) infection in man"; (*b*) Wassermann reaction and its relation to provocative injection; and (*c*) "Allergic phenomena of B. Typhosus".

Medical College, Calcutta.—The department of Biology continued an investigation on fish and plant morphology and anatomy of Bengal plants. An experimental study of asphyxiation in the air breathing fishes of Bengal was also made. The Physiological department published 6 papers entitled, (*i*) A preliminary note on the pharmacological action by *Antiaris toxicaria*; (*ii*) Snake poisoning; (*iii*) Glycosis in blood; (*iv*) A study of gastric acidity in Indians; (*v*) Distribution of glucose between corpuscles and plasma; and (*vi*) Extreme hypoglycaemia in chronic diseases.

The studies in the Pathological department included among others those on actinomycosis of the human body; streptococcal septicaemia and filarial

orchitis ; pathological and laboratory diagnosis of gonorrhoea ; dermal leishmanoid ; cutaneous manifestation of Bengal splenomegaly ; the reticuloendothelial system and its rôle in the problems of immunity ; facial cellulitis and the incidence of dysenteric conditions amongst Europeans in Calcutta. Three papers were published, *viz.*, (*i*) Study on the parasites of kala-azar and their distribution in the body ; (*ii*) Some factors regulating metastases in carcinoma and their influence on prognosis ; and (*iii*) The pathological aspect of epidemic dropsy. The department of Medicine investigated the action of insulin in some non-diabetic cases :—(*a*) asthenia and loss of weight ; (*b*) catarrhal jaundice and cholaemia ; (*c*) acidosis in infectious diseases ; (*d*) the action of atebrin in malaria ; (*e*) the qualitative serum diagnosis of enteric fever with H. & O. antigen ; (*f*) the rule of detoxicated vaccine in the treatment of pneumonia and enteric fever ; (*g*) the value of tuberculin in pyrexia of uncertain origin ; (*h*) blood sedimentation in various diseases ; (*i*) and the fragility of red blood cells in various diseases. The Skin department carried out research work on the various aspects of dermatology, including *vermilion* alopoecia ; *alta* dermatitis ; leucoderma ; tropical melanodermas and granulomatas ; cutaneous syphilides ; and leprosy.

King Edward Memorial Hospital and Seth Gordhan Das Sunderdas Medical College, Bombay.—No research work was in progress during the year under report.

Medical College, Madras.—The department of Anatomy continued the investigation into (*a*) the relationship of stature to the length of long bones of the body and (*b*) the development of the bat's wing. The department of Dermatology also continued investigations on psoriasis during the year. The University Extension Board lectures on the modern treatment of leprosy based on observations in the hospital and on new drugs were published in the "Antiseptic". The research work done in the Biochemistry department on blood proteins in kala-azar and other conditions was published in the Indian Journal of Medical Research in October, 1933. The Midwifery department investigated the causes of maternal mortality in Madras city and the results obtained were published. Another report on the experimental study of a rare case of hypothyroidism was also published. The Pathology department continued investigation on the cultivation and transmission of *Rhinosporidium* and though successful results were not obtained, the conclusions arrived at were promising. A detailed study of the various hyperplastic and neoplastic conditions of the lymph nodes was made and a paper on the pathology of some uncommon enlargements of the lymph nodes was under preparation. Another paper containing the results of investigation in a case of primary Hodgkin's disease has been sent for publication. This department also published a paper on an unusual form of tuberculosis.

The Pharmacological department published papers on (*i*) The cardiovascular action of urea stibamine ; (*ii*) The influence of anaesthetics on the bio-assay of digitalis ; and (*iii*) A synthetic derivative of cotarnine. The following pieces of research were either in the initial stage or were nearing completion :—(1) On the relation of the thyroid to the gonads and the sexual cycle ; and (2) On the keeping properties and potency of solid and liquid digitalis preparations. A report on the potency of samples of digalin was nearing completion.

The Physiology department studied the effects of lack of vitamins A and D in normal and pregnant albino rats and of the efficacy of administration of placenta as compared with that of liver. An experimental investigation was

also being carried on of the effects of histamine and acetyl-choline on the blood-pressure and on the movements of the intestine in anaesthetised cats. Two papers of scientific importance were published, *viz.*, (*i*) Studies on the function of the intestinal musculature.—Are the intestinal movements neurogenic or myogenic ? ; and (*ii*) The influence of adrenaline, pituitary extracts and insulin on the movements of the intestine.

The research unit published four papers during the year of which two are in the press. The chemical examination of *Tylophora asthmatica* which was carried on by the unit has shown the presence of some important constituents in the plane. A paper embodying observations on the yellow crystalline constituent of the leaves of *Colycopterus floribunda*, synonymous with *Combretum extendum*, was ready for publication. This investigation showed that the substance belongs to the group of natural Flavones. The Ophthalmology department published five papers.

IV. Medical Schools.

165. The 27 medical schools in existence are distributed as follows :—Bengal 10 ; Madras 3 ; Bombay 4 ; U. P. 2 ; Punjab 2 ; Bihar and Orissa 2 ; Burma 1 ; C. P. 1 ; Assam 1 ; and Central India 1.

Punjab.

166. (*a*) *Medical School, Amritsar.*—Of 401 students on the rolls 28 belonged to the military students' class. 102 students appeared for the final L. S. M. F. and 65 passed.

(*b*) *Punjab Medical School for Women, Ludhiana.*—127 students were on the rolls, 24 passed the final professional Licentiate examination.

United Provinces.

167. (*a*) *Medical School, Agra.*—Of 309 students on the rolls 37 belonged to the military students' class.

Examination Results.

	Appeared.	Passed.
Primary	49	46
Intermediate	86	52
Final Part I	70	53
Final	86	63

(*b*) *Women's Medical School, Agra.*—100 students were on the rolls.

Examination Results.

	Appeared.	Passed.
Primary	18	18
Intermediate	23	19
Final Part I	16	14
Final	21	15

Bihar and Orissa.

168. (*a*) *Medical School, Darbhanga.*—There were 230 students on the rolls; 55 appeared for the final Board examination and 27 passed; 76 students of the compounder class appeared for the qualifying examination and 55 passed.

(*b*) *Orissa Medical School, Cuttack.*—There were 201 students on the rolls. 63 students appeared for the final Board examination and 28 passed, 46 candidates appeared for the compounders examination and 28 passed.

Bengal.

169. (*a*) The following table summarises details of the Medical Schools in the Presidency.

State Medical Faculty.

	On Rolls.	Primary.		Intermediate.		Final.		Compounders Examination.	
		A.	P.	A.	P.	A.	P.	A.	P.
Campbell School, Calcutta.	615	94	70	163	101	173	103	54	49
Lytton School, Mymensingh.	241	69	39	42	23	58	35	6	6
Ronaldshay School, Burdwan	203	30	20	70	40	70	24	17	11
Chittagong School . .	173	64	37	60	30	13	7	...	...
Jackson School, Jalpaiguri ,	177	32	23	79	29	8	3	...	...
Bankura Sammilani School .	227	60	41	117	44	63	23	...	...
National Medical Institute, Calcutta.	413	104	81	138	59	147	48	...	...
Dacca Medical School. .	514	111	66	174	66	151	70	49	43
Calcutta Medical School.	443	95	60	133	69	125	51	...	...

(*b*) *School of Tropical Medicine, Calcutta.*—A total of 98 students were on the rolls.

Examination Results.

	Appeared.	Passed.
D. T. M.	38	33
D. P. H. { Part I	23	23
D. P. H. { Part II	27	24
L. T. M.	39	22

Central Provinces.

170. *Robertson Medical School, Nagpur.*—There were 276 students on the rolls. 84 students appeared for the final Board examination and 43 passed.

Central India.

171. *King Edward Medical School, Indore.*—There were 305 students on the rolls.

Examination Results.

	Appeared.	Passed.
1st L. C. P. and S. (Bombay)	*Nil.*	*Nil.*
2nd L. C. P. and S. (Bombay)	2	2
Final L. C. P. and S. (Bombay)	13	6
L. M. P. (Nagpur)	75	36
L. M. F. (Calcutta)	24	8
Compounders	127	92

Bombay.

172. The L. C. P. S. examination results are given below :—

	1st.		2nd.		Final.	
	A.	P.	A.	P.	A.	P.
B. J. Medical School, Poona	62	55	102	55	149	45
B. J. Medical School, Ahmedabad	63	39	59	29	65	17
Medical School, Hyderabad (Sind)	31	25	53	31	31	9
National Medical College, Bombay	92	46	78	46	114	22

Madras.

173. Examination results are given below :—

	On rolls.	1st year.		2nd year.		3rd year.		Final Part I.		Final Part II.	
		A.	P.	A.	P.	A.	P.	A.	P.	A.	P.
Stanley Medical School	*503	86	60	111	64	121	102	44	42	247	126
Lady Willingdon Medical School for Women.	98	19	8	26	18	22	16	...	...	43	21
Missionary Medical School for Women, Vellore.	108	21	11	31	25	19	17	23	14	23	5

* This large number is due to the transfer of students from Tanjore Medical School which was abolished with effect from 1st May 1933.

Assam.

174. *Berry-White Medical School, Dibrugarh.*—235 students were on the rolls. Of these 50 appeared for the final examination and 23 passed. Of the 64 students who appeared for the compounders examination 38 passed.

Burma.

175. *Burma Government Medical School, Rangoon.*—The total number of students on the rolls was 172 ; these comprising 138 old students, 33 new admissions and one re-admission. 66 students appeared for the final examination, Part II, and 27 passed.

The Countess of Dufferin's Fund.

176. A total of 288 women students were on the rolls in different medical colleges in India. 27 scholarships were awarded, 18 at the Lady Hardinge Medical College, Delhi, 3 at Bombay, 3 at Madras and 3 at Calcutta. Of

these scholarships, 18 were awarded from Association funds and the remainder from Trust funds administered by the Countess of Dufferin's Fund.

The extent of work done in Dufferin Hospitals may be estimated from the following figures :—

New in-patients	131,022
New out-patients	2,074,598
Out-patients (old and new)	4,965,830
Gynaecological cases—	
Indoor	10,808
Outdoor	75,294
Midwifery cases—	
Abortion	1,529
Normal labour	8,765
Abnormal labour	2,655
Operations—	
Abdominal	1,506
General or spinal anaesthesia	12,051

SECTION X.

HEALTH OF JAILS IN INDIA.

Population, Sickness and Mortality Rates.

177. The average population, excluding that of the Andamans, was 145,437, as compared with 156,152 in 1932 and 129,312 the decennial mean. With the collapse of the civil disobedience movement, decreases were recorded in every province except Bengal. The numbers fell by 539 in Burma, 543 in B. and O., 584 in the Punjab, 672 in the C. P., 1,037 in the N.-W. F. P., 1,499 in Madras, 2,733 in Bombay and 3,357 in the U. P.

Table X (*i*) gives the authorised accommodation, the daily average population and the maximum population confined on any one day in jails and sub-jails during 1932 and 1933; it shows that considerable overcrowding still existed in some provinces.

TABLE X (*i*).

	Authorised accommodation excluding hospitals and observation cells.		Daily average population.		Maximum number confined on any one day.	
	1933.	1932.	1933.	1932.	1933.	1932.
N.-W. F. P. . .	**5,053**	5,051	**6,838**	7,944	**7,764**	10,650
Punjab . . .	**15,013**	15,013	**22,378**	23,058	**28,134**	30,941
U. P. . . .	**32,081**	33,827	**33,346**	36,703	**35,321**	37,254
B. and O. . .	**13,730**	14,301	**13,562**	14,379	**20,121**	22,685
Bengal . . .	**18,151**	18,999	**21,405**	22,618	**30,073**	32,671
C. P. . . .	**6,518**	6,518	**4,901**	5,665	**6,311**	7,511
Bombay . . .	**20,186**	23,186	**19,085**	19,085	*	*
Madras . . .	**20,316**	25,096	**14,761**	16,134	*	*
Assam . . .	**3,508**	3,552	**3,804**	3,809	*	*
Burma . . .	**20,197**	20,923	**21,145**	21,680	*	*

NOTE.—The statistics in this table include those of sub-jails.

178. The constantly sick rate, exclusive of the Andamans, was 22 p.m., as against 23 in 1932. Provincial rates were Bengal 37, N.-W. F. P. 35, Assam 26, B. and O. 25, Punjab 23, Bombay 22, U. P. 20, Madras 17, Burma 11, and C. P. 10. In B. and O. and Assam the rate was less than those of 1932 and the decennial mean; in N.-W. F. P. and Bombay it exceeded both these rates; in Bengal and Madras it was lower than that of 1932 but exceeded the mean.

Abbreviations :—

N.-W. F. P.—North-West Frontier Province.
B. and O.—Bihar and Orissa.
U. P.—United Provinces of Agra and Oudh.
p.m.—Per mille.
C. P.—Central Provinces and Berar.
I. G. of P.—Inspector-General of Prisons.
C. S. fever—Cerebro-Spinal Fever.
*Not available.

179. Excluding the Andamans, the general admission to hospital rate, remained high at 560·1 p.m. although it was lower than that for 1932 and the decennial mean. The highest admission rate was again recorded in Bengal (1,093 p.m.) owing to the high incidence of malaria and bowel complaints; Burma (239 p.m.) recorded the lowest rate. In other provinces the figures were Punjab (746), Bombay (666), N.-W. F. P. (641), Assam (561), U. P. (474), B. and O. (462), Madras (290) and C. P. (277). The rate in Bombay was in excess of that for 1932 and the decennial mean; in N.-W. F. P., Punjab, U. P., B. and O., C. P., Assam and Burma the rates were less than the decennial mean; the decrease in Burma was the most noticeable.

Comparing geographical groups, Bengal and Orissa recorded the highest admission rate of 1,072 p.m., as against 1,077 p.m. in 1932 and 946 p.m., the decennial mean. Other high rates were 710 in the North-West Frontier, Indus Valley and North Western Rajputana; 695 in the Upper Sub-Himalayan Region; 565 in the Hills; 542 in Assam; 537 on the Western Coast; 516 in the Deccan; and 468 in the Gangetic Plain and Chota Nagpur. The rate in Southern India (282) was again the lowest.

The Andamans recorded a rate of 552 p.m. as against 521 in 1932 and 690 the decennial mean.

180. Excluding the Andamans, the death rate was 11·2 p.m. as against 10·7 p.m. in 1932 and 13 p.m. the decennial mean. Compared with the previous year, death rates were higher in N.-W. F. P., Punjab, B. and O., C. P., Bombay and Madras, and lower in the U. P., Bengal, Assam, Burma and the Andamans. In the N.-W. F. P., the high death rate was mainly due to the bad or indifferent health of many prisoners on admission; in the Punjab to the greater prevalence of malaria; and in Madras Presidency to the outbreak of gastro-enteritis and bowel complaints caused by defective water supply in the Trichinopoly jail. Further details will be found in Part IV.

The highest death rate, 17·9 p.m. was reported in the Hills and the lowest, 5·9 p.m. in South Western Rajputana, Central India and Gujarat.

Causes of Sickness and Mortality.

181. The principal recorded causes of sickness and their rates *per mille* of jail population, exeluding the Andamans, were malaria (172 p.m.), dysentery (35), abscess, ulcer and boil (34), influenza (31), respiratory diseases (30), diarrhœa (20), pneumonia (10), pyrexia of uncertain origin (9), anæmia and debility (8) and tubercle of the lungs (6).

Malaria showed an increase of 16·7 p.m.; decreases were recorded under other causes.

The principal causes of death and their rates *per mille* of the jail population, excluding the Andamans, were pneumonia (2·3 p.m.), tubercle of the lungs (1·7), dysentery (0·8), malaria (0·6), respiratory diseases (0·4), enteric fever (0·3), anæmia and debility (0·3) and diarrhœa (0·2). The death rate from pneumonia decreased; the rates from malaria, dysentery and anæmia and debility rose; those from enteric fever, tubercle of the lungs, respiratory diseases and diarrhœa were stationary.

Including the Andamans, the death rate for malaria was 0·7 p.m., that for dysentery 0·8, and that for anæmia and debility 0·4.

Infectious disease was kept well under control. Cerebro-spinal fever was responsible for 106 admissions with 54 deaths; of these 44 and 15 respectively were in the Punjab, 26 and 20 in Bombay Presidency, 16 and 9 in B. and O. 14 and 7 in the district jail, Delhi, 5 and 3 in Burma and 1 non-fatal case in the Madras Presidency. This disease has prevailed in India for more than half a century but has not received the attention it deserved, because most of the records of its incidence have remained buried in the archives of hospitals, regiments and prisons and because cases have been variously returned as spinal meningitis,

cerebral meningitis, inflammation of the membranes, brain and cord, inflammation of the brain and membranes, inflammation of the cerebral membranes, etc.

182. *Influenza.*—Excluding 93 admissions in the Andamans, 4,536 admissions and 18 deaths from this cause were recorded in Indian jails, against 5,534 and 29 respectively in 1932. The incidence in jails during the quinquennium ending 1933 is given in Table X (*ii*).

TABLE X (*ii*).

	Admission rates *per mille*.				
	1929.	1930.	1931.	1932.	1933.
India	**23·6**	**33·9**	**51·0**	**34·0**	**30·4**
N.-W. F. P.	..	52·6	22·9	18·0	**5·9**
Punjab	23·5	17·7	46·9	10·2	**3·0**
U. P.	24·6	23·5	48·6	38·6	**28·3**
B. and O.	46·6	48·1	81·5	28·4	**23·3**
Bengal	25·6	72·5	113·6	106·0	**106·6**
C. P.	5·7	42·0	45·2	9·6	**51·5**
Bombay	25·5	19·6	10·1	9·4	**3·0**
Madras	32·0	32·8	53·1	55·7	**59·6**
Assam.	14·0	46·8	97·0	45·1	**28·4**
Burma	24·9	45·6	62·2	22·2	**16·5**
Andamans	0·4	2·9	2·4	2·7	**14·0**

Of the total, 1,775 admissions were recorded in Bengal, 944 in the U. P., 701 in Madras Presidency, 345 in Burma, 267 in B. and O., 222 in C. P., 108 in Assam, 93 in the Andamans, 52 in the Punjab, 41 in Bombay, 41 in N.-W. F. P. and 30 in other areas.

183. *Cholera.*—Only 5 admissions were registered against 26 admissions and 7 deaths in 1932. These included 2 in Bengal and 3 in the Western India States (Palanpur). The jails of other provinces were free.

184. *Smallpox.*—56 admissions with 2 deaths were reported as compared with 86 and 5 in 1932. Of these 19 non-fatal cases occurred in the U. P., 7 with 1 death in Burma, 6 in Bengal, 6 in Bombay, 16 with 1 death in other provinces and 2 in the Andamans.

185. *Dysentery.*—5,283 admissions and 124 deaths were recorded as against 7,080 and 120 respectively in 1932. Bengal recorded 1,076 admissions with 18 deaths ; Punjab 819 and 20 ; B. and O. 605 and 21 ; Bombay Presidency 591 and 2 ; Assam 509 and 6 ; U. P. 486 and 5 ; Madras 460 and 15 ; Burma 310 and 16 ; 162 and 13 in the Andamans ; 120 and 4 in N.-W. F. P. ; C. P. 105 and 3 ; and 40 and 1 in other areas. In the Punjab, Bengal and Assam the admission rate exceeded that for 1932 and the decennial mean ; in U. P., B. and O., C. P., Bombay, Madras and Burma, it was lower.

Comparing geographical groups, the largest number of admissions were recorded in Bengal and Orissa (1,116), followed by the Gangetic Plain and Chota Nagpur (878), North-West Frontier, Indus Valley and N. W. Rajputana (687), the Upper Sub-Himalayan Region (629), Assam (493), Southern India (359), the Deccan (328), the Western Coast (220), the Coast of Burma and Bay Islands (212), the interior of Burma (98), South Western Rajputana, Central India and Gujarat (72) and the Hills (28). The incidence *per mille* of average population is given in Table B on pages 386-387.

186. *Diarrhœa.*—2,938 admissions and 35 deaths were reported as against 3,626 and 32 in 1932. Of these 933 or nearly 32 % occurred in Bengal; 521 or 18% in B. and O.; 431 or 15% in the U. P.; 361 or 12% in Bombay, 358 or 12% in the Punjab. In N.-W. F. P., C. P., Madras, Assam and Burma the incidence was low.

Comparing geographical groups, the eastern side of India comprising Bengal and Orissa continued to record the highest admission rate (54 p.m.), followed by the Deccan (25); the Western Coast (24); the Gangetic Plain and Chota Nagpur (24); the Hills (23); the Upper Sub-Himalayan Region (18); Assam (18); N.-W. Frontier, Indus Valley and N.-W. Rajputana (14). In Burma, S.-W. Rajputana, Central India and Gujarat and Southern India, the incidence was as usual low.

Compared with 1932, decreases were recorded in C. P. (—10·7), B. and O. (—9·5), Bombay (—7·4), Assam (—6·3), the Punjab (—3·5), U. P. (—2·7), Bengal (—2·4) and Burma (—0·2). In N.-W. F. P. the admission rate rose by 2·3 p.m. and in Madras by 0·4.

Table X (*iii*) gives combined figures for dysentery and diarrhœa similar to that inserted in recent reports.

TABLE X (*iii*).

	Admission rate p.m.			Death rate p.m.		
	Mean 1923-32.	1932.	1933.	Mean 1923-32.	1932.	1933.
India	**57·4**	**65·5**	**54·0**	**1·7**	**0·9**	**1·0**
N.-W. F. P. . .	32·9	22·4	**27·1**	0·4	0·1	**0·9**
Punjab . . .	35·6	58·1	**57·6**	0·9	0·8	**1·6**
U. P.	32·0	37·3	**27·5**	0·8	0·8	**0·3**
B. and O. . . .	138·7	198·3	**98·2**	2·1	1·4	**1·9**
Bengal . . .	124·8	117·6	**120·6**	1·9	1·1	**1·3**
C. P.	65·9	65·9	**37·2**	1·6	1·2	**1·2**
Bombay . . .	76·4	93·2	**69·6**	0·7	0·3	**0·3**
Madras . . .	44·3	46·3	**41·1**	1·8	0·6	**1·5**
Assam. . . .	131·4	139·7	**155·6**	4·2	4·2	**1·6**
Burma . . .	38·8	20·0	**16·5**	3·0	1·1	**0·8**
Andamans . . .	45·0	14·3	**30·5**	5·0	1·5	**2·2**

The admission rate for 1933 for dysentery and diarrhœa combined was only 40% of the decennial mean in Burma. In N.-W. F. P., U. P., B. and O., Bengal, C. P., Bombay and Madras and the Andamans also it was lower than the mean, but increases were recorded in the Punjab and Assam, due to the prevalence of dysentery in the Multan and Gauhati district jails.

As compared with 1932, the combined admission rate fell in the C. P. by 29 p.m., in Bombay by 24, in U. P. by 10, in Madras by 5 and in Burma by over 3. In the Punjab and B. and O. small decreases occurred. The combined death rate rose slightly in N.-W. F. P., Punjab, B. and O., Bengal, Madras and the Andamans.

187. *Malaria.*—Excluding the Andamans, 25,018 admissions with 83 deaths were recorded as against 24,250 and 74 in 1932. The admission rate was 172 p.m., the rate for 1932 being 155 p.m. and the decennial mean 174 p.m. In the Andamans 1,621 admissions and 18 deaths were reported, *i.e.*, an admission rate

of 245 p.m. and a death rate of 3 p.m. as compared with 243 and 5 in 1932 and 319 and 5 the decennial mean. The highest admission rate was recorded in Bengal (334 p.m.), followed by the Punjab (315), Bombay Presidency (298), N.-W. F. P. (259), Andamans (245), Assam (131), and U. P. (127). The incidence was as usual low in Burma (18 p.m.), Madras Presidency (22), C. P. (43) and B. and O. (68). In Bengal and Bombay, the admission rate was in excess of the rate for 1932 and the decennial mean; whilst in N.-W. F. P., U. P., B. and O., C. P., Madras and Burma it was lower.

Bengal and Orissa with an admission rate of 328 p.m. suffered worst, other high rates being N.-W. Frontier, Indus Valley and Western Rajputana (304), the Upper Sub-Himalayan Region (287), Andamans (245), the Hills (227), the Deccan (198), S. W. Rajputana, Central India and Gujarat (132) and Assam (130). In Burma and Southern India the incidence was lowest; the Western Coast and the Gangetic Plain also reported low rates.

The mortality rate, excluding the Andamans, was 0·6 p.m. as against 0·5 p.m. in 1932 and 0·6 the decennial mean and, including the Andamans, the rate was 0·7 as against 0·7 in 1932 and 0·9 the decennial mean. The death rate varied between 2·7 p.m. in the Andamans and 0·2 in Madras.

188. *Pneumonia.*—Excluding 37 admissions and 8 deaths in the Andamans, a total of 1,504 admissions and 328 deaths were ascribed to this cause as compared with 2,060 and 428 in 1932.

N.-W. F. P. continued to report the highest incidence (21 p.m.), and Madras the lowest (3·7). Other provinces recording high incidence were B. and O. (17 p.m.), Assam (15); Bombay Presidency (13) and Bengal (12).

B. and O. (3·4 p.m.) headed the list of mortality rates, followed by N.-W. F. P. (3·3), Assam (3·2), Bengal (3·0), Punjab (2·7), Bombay Presidency (2·7), C. P. (2·3), Burma (1·7), U. P. (1·6) and the Andamans (1·2).

Excluding the Andamans, the admission and death rates were 10·3 and 2·3 p.m. respectively as compared with 12·8 and 2·6 in 1932 and 11·7 and 2·5 the decennial mean.

189. *Tubercle of the lungs.*—Excluding 36 admissions and 14 deaths in the Andamans, 815 admissions and 241 deaths were registered as against 922 and 259 in 1932. Assam (10·8 p.m.) headed the list of admission rates; followed by the Punjab (9·9 p.m.), N.-W. F. P. (8·1), C. P. (7·7), B. and O. (5·8), Andamans (5·4), Madras (5·4), Bengal (5·2), Burma (4·1), U. P. (3·9), and Bombay (3·0). The mortality rates were 2·6 p.m. in B. and O. and in Assam; 2·2 in N.-W. F. P. and in Burma; 2·1 in C. P. and in the Andamans; 2·0 in Madras; 1·4 in Bengal, 1·3 in the U. P.; 1·2 in Bombay and 1·1 in the Punjab.

The death rate, excluding the Andamans was 1·7 p.m. as against 1·7 in 1932 and 2·4 the decennial mean.

Provision for the segregation and treatment of tubercular patients is on much the same scale as in previous years.

N.-W. F. P.—Abbottabad Jail (40 beds).

Punjab.—Owing to the limited accommodation available at the Multan new central jail, cases were also treated in other institutions.

U. P.—Sultanpur jail.

B. and O.—Tubercular prisoners from North Bihar are housed in Bhagalpur jail and a tubercular ward exists at Buxur. Other jails where such patients are segregated for treatment include Gaya central, Purulia district and Motihari district.

Bengal.—Suri and Comilla jails.

C. P.—Chhindwara jail.

Bombay.—Special provision for the segregation and treatment of tubercular patients exists in the central jails at Belgaum, Yeravda, Ahmedabad and Hyderabad and in the district jail at Karachi.

Madras.—All cases of tuberculosis, except those in advanced stages and unfit to travel, are concentrated in the Wellesley Sanatorium jail, Bellary.

Assam.—Separate wards for treatment exist at Sylhet, Gauhati and Tezpur.

Burma.—The Myingyan tubercular ward has accommodation for 50 cases.

Andamans.—All tubercular cases are treated in the Haddo Hospital.

Weight of Prisoners.

190. Table X (*iv*) shows in percentages the condition of prisoners on discharge. The table is arranged in the order of loss of weight :—

TABLE X (*iv*).

Provinces.	Gained weight.	Stationary.	Lost weight.
Andamans *	24	9	27
Aden	32	43	25
Bombay	55	21	24
Bengal	67	15	18
B. and O.	53	31	16
Assam	55	32	13
C. P.	60	28	12
N.-W. F. P.	56	32	12
U. P.	57	32	11
Burma	60	30	10
Coorg	70	20	10
Punjab	45	46	9
Madras	74	19	7

Increases in the percentage of those who gained weight were recorded in Bengal 9%, Punjab 6%, Bombay 4%, Assam 1% and U. P. 1%.

In the Andamans, of those discharged from the cellular jail to the Settlement on completion of sentences for local offences, 5% gained weight and 4% lost weight; for those released or repatriated from the Settlement on other than medical grounds, the figures were 11% and 11%; and for those repatriated to Indian jails on medical grounds, the figures were 14% and 7%.

In the Madras Presidency, Salem recorded the highest percentage of those who lost weight (26%), followed by Bellary central (18%), Vizagapatam (17%), the Wellesley Sanatorium (16%), Cannanore central (13%), Madura (11%) and Presidency jail for women, Vellore (10%) whilst the Borstal School, Palamcottah, again returned the lowest percentage (0·4%).

Special Remarks on Provinces.

191. *N.-W. F. P.*—The province has 6 jails and 9 lock-ups. The former group include 3 central and 3 district institutions which provide for 5,053 prisoners, whilst the maximum number confined on any one day was 7,764 as against 10,650 in 1932. Owing to the subsidence of political agitation, the release of large numbers of Red Shirt prisoners, and the more settled conditions prevailing in the province, the daily average population fell from 7,927 in 1932 to 6,838. Including the 9 lock-ups, the daily average population of 8,466 in 1932 fell to 7,230, but this is still in excess of the quinquennial mean, *viz.* 5,824.

* In 40% of the cases no weight was recorded.

An adolescent training centre, on the lines of a borstal institution, was opened in the Haripur central prison and provided accommodation for 350 young convicts who had hitherto been treated in the Borstal Institution, Lahore.

The admission to hospital rate fell from 733 p.m. in 1932 to 648 p.m. On the other hand, the daily average sick and death rates rose from 32 and 11·41 to 35 and 12·6 p.m. respectively, and this increase was ascribed to the admission of many prisoners in bad or indifferent health due to chronic malaria.

On the whole, the general health of prisoners was good and no major or minor epidemics occurred throughout the year.

Total admissions numbered 4,430 and deaths 86, these including 4,110 admissions and 78 deaths among convicts. Of the admissions among convicts, malaria caused 1,652, pneumonia 123 (303 in 1932), dysentery 112, diarrhœa 65 (264 in 1932), pulmonary tuberculosis 60 and other tubercular disease 17.

Of the deaths among convicts, 20 were due to pneumonia, 15 to pulmonary tuberculosis, 4 to dysentery, 3 to malaria and 2 to diarrhœa.

Dietary charges per head fell from Rs. 32-2-0 to Rs. 30-12-1 and clothing and bedding charges from Rs. 13-9-10 to Rs. 10-1-9. Hospital charges were also less than in the previous year due to a decrease in the number of sick and convalescent prisoners. The sanitation charges fell from Rs. 2-0-3 to Rs. 1-4-0 per head, mainly owing to the completion of the Haripur central jail buildings and the consequent decrease in expenditure on sanitary arrangements in that institution.

192. *Punjab.*—The available jail accommodation provided for 16,607 prisoners, whilst the daily average population was 22,378, or 5,771 in excess of the authorised accommodation. This excess, which was mainly due to the marked increase in the number of long-term prisoners and the introduction of voluntary instead of compulsory transportation to the Andamans, was relieved to some extent by the re-transfer of a large number of prisoners belonging to the N.-W. F. P. Moreover the *Ahrar* or civil disobedience movement disappeared and the numbers of short-term sentences decreased. The surplus population was spread over all jails and, at the end of the year, almost every jail had more than its sanctioned maximum quota. The maximum number confined on any one day in the jails, excluding hospitals and observations cells, was 28,134 as compared with 30,941 in 1932. It reflects credit on the general administration that, despite overcrowding, the continued presence of c. s. fever and the severe incidence of malaria throughout the province, the year under review was a normal one.

Although the admission to hospital rate declined from 785 p.m. in 1932 to 761, the daily average sick and the death rates rose from 21 p.m. and 12·2 p.m. to 23 p.m. and 14·0 p.m. respectively. Jails recording high death rates included Ambala (48·6 p.m.), Multan new central (40·7), Attock (23·6), Rawalpindi (22·7) and Campbellpur (20·3); Hissar (2·1), Gurjanwala (2·2) and Rohtak (2·9) reported the lowest mortality. In Ambala, all the deaths occurred among debilitated prisoners, but the high incidence of malaria was a contributory cause. The high mortality figures for the Multan new central jail was due to the concentration there of all tubercular cases.

The main cause of sickness was, as usual, malaria whilst tuberculosis and pneumonia were responsible for most deaths. Cholera was absent; but 11 cases of smallpox were recorded. Malaria caused 6,349 admissions with 16 deaths; although no jail escaped, these cases occurred chiefly in the Lahore Borstal Institution (567 admissions), Rawalpindi (554), Multan central old (523), Lahore central (444), Attock (437), Multan district (361) and Montgomery (349). Routine anti-malarial measures were carried out, quinine parades were regularly carried out, and though they could not stop the incidence of malaria altogether, they certainly lessened the relapses very considerably.

Other causes of admission to hospitals were abscess, 1,018 cases, "other respiratory diseases" 761; dysentery 503; diarrhœa 326: pneumonia 181; anæmia and lebility 174; and tuberculosis 165.

Dysentery was prevalent chiefly in the Multan district jail; preventive measures included greater care in the preparation of food, provision of well-equipped kitchens and protection from flies.

Seven jails recorded 44 admissions with 15 deaths from c. s. fever; Lahore Borstal had 12 cases and 1 death, Lahore central 13 and 5; Rawalpindi 4 cases; Ambala 8 and 5, Multan district 2 fatal cases, Sialkot 4 and 1; and Gujranwala one fatal case. The usual prophylactic measures were carried out, but the disease is said to have become almost endemic in some of the jails.

The marked increase under tuberculosis was said to be due to the prevalence of virulent malaria and the consequent lowering of vitality. The incidence of pneumonia was low.

Enteric fever accounted for 60 admissions and 9 deaths.

There were 5 leper convicts in the special ward at Mianwali at the end of 1933, 1 being admitted and 2 released during the year. 33 convicts were certified as insane, but their mental derangement did not appear to be connected in any way with the conditions of prison life.

The health division of the Public Works Department spent Rs. 93,535 on sanitary works.

Dietary charges increased from Rs. 5,76,347 in 1932 to Rs. 6,88,651 due mainly to higher prices of food grains and to the issue of costly diets to approvers and A and B class prisoners; clothing and bedding charges fell from Rs. 13-12-6 to Rs. 9-2-1 per head; whilst a slight increase from Rs. 3-1-4 to Rs. 3-7-4 was recorded under sanitation charges. This increase was incurred in measures taken to prevent the spread of c. s. fever and other diseases.

Scouting, games and recreation were as usual encouraged.

193. *U. P.*—The daily average population of the 56 jails in this province, including 6 central, 49 district and 1 juvenile with available accommodation for 33,845 persons, excluding hospital and observation cells, declined from 36,703 to 33,346. This was mainly due to the suspension of the civil disobedience movement. The largest population on any one day was 35,321 in January.

Special female accommodation was as usual provided in the Lucknow, Benares and Fatehgarh central jails. The Juvenile jail at Bareilly continued to be run on a modified Borstal system.

Vital statistics indicated improvement in health conditions. Both the admission to hospital rate 474 p.m. and the daily average sick rate, 20 p.m. were lower, whilst the death rate, 6·6 p.m., was the lowest on record.

Malarial surveys of the jails at Benares, Agra, Saharanpur and Bulandshahr and the Naini central prison were carried out.

The main causes of sickness were 'other general diseases' 5,838 admissions; malaria 3,555; abscess, boil and ulcer 1,588; other respiratory diseases 1,002; dysentery 368; diarrhœa 350; pneumonia 235; anæmia and debility 145; and tuberculosis 147. Plague and cholera were both absent. 52 deaths were ascribed to "other general diseases", 48 to pneumonia, 42 to tuberculosis, 16 to other respiratory diseases, 8 to malaria, 5 to dysentery, 5 to diarrhœa, 4 to anæmia and debility and 3 to abscess, boil and ulcer. Of the 122 tubercular cases, including 77 new admissions treated in the tubercular jail at Sultanpur, 19 died, only one was cured and 24 incurable cases were released.

Leprosy cases were, as usual, concentrated in the Rae Bareli district jail; total admissions numbered 164 and 2 died. Most of the admissions were in indifferent health. Treatment by injection of iodised ethyl esters of hydnocarpus oil was continued. The general health of the leper prisoners was satisfactory and two cases were cured.

Government sanctioned allotments of Rs. 8,018 for re-roofing, Rs. 6,702 for water supply, Rs. 3,694 for latrines and Rs. 5,249 for cook-houses. The Discharged Prisoners Aid Society expended Rs. 4,090 during the year.

Dietary charges per head rose to Rs. 28-3-10 and hospital charges to Rs. 2-2-2 per head, whilst the cost of clothing and bedding fell to Rs. 3-9-0 and that on sanitation to Rs. 1-7-8.

194. *B. and O.*—As in 1932, 4 central, 12 district, one juvenile and 50 subsidiary jails provided accommodation for 13,730 prisoners.

In order to relieve overcrowding, the sub-jails at Arrah, Chaibassa, Balasore and Daltonganj were again used as district jails and the camp jail at Patna was also maintained. New works included the construction of 10 cells in the district jail at Purulia, the provision of roof ventilators in the cells of the Hazaribagh central jail, an electric installation in the Bankipur jail and the sinking of a new tube well in the sub-jail at Barh.

The daily average population fell from 14,379 in 1932 to 13,562, owing to the release of civil disobedience prisoners and of juveniles and aged and infirm prisoners convicted of minor offences. The maximum number confined on any one day was 22,685.

Despite overcrowding the general health was satisfactory. The admission to hospital rate was 508 p.m. and the daily average sick rate was 23 p.m., but whilst these showed appreciable decreases, the death rate, increased from 12 to 14 p.m. Jails recording high death rates included Motihari (35 p.m.), Dumka (34), Monghyr (26), Purnea (25), Purulia (24), Bhagalpur (20) and Muzaffarpur (18).

Only one case of cholera was recorded as against 6 cases with 3 deaths in 1932.

Of the 726 admissions for dysentery, as against 1,942 in 1932, Patna camp jail alone had 304 and Purulia and Bhagalpur combined reported 128. Malaria was responsible for 2,229 admissions ; influenza 281 ; pneumonia 162 ; diarrhœa 708 ; abscess, ulcer and boil 191 ; and pulmonary tuberculosis 73 with 30 deaths.

Ankylostomiasis was the cause of 587 admissions and 24 deaths, Bhagalpur central jail recording the largest numbers. All admissions were treated with carbon tetraform. The examination of newly admitted prisoners for hookworm infection was continued, and of 16,585 cases examined, 7,333 or 42% were found positive.

The central jail at Bhagalpur was responsible for 22 admissions to hospital and 10 deaths from pulmonary tuberculosis ; 6 cases with 4 deaths occurred in the Buxar central jail.

Leprosy cases were segregated in the Muzaffarpur district jail. The treatment of lepers was grouped as follows :—

(*i*) medicinal group (old system), (*ii*) dietetic *plus* extras, (*iii*) dietetic *plus* vitamins, (*iv*) leper diet *plus* vegetables and fruits. Groups (*ii*) to (*iv*) were found to give as good results as the medicinal treatment with specific drugs. The daily average number of cases was 45.

Dietary, hospital, clothing and bedding charges per head fell from Rs. 34-13-0, Rs. 6-13-0 and Rs. 7-12-0, to Rs. 34-0-0, Rs. 5-9-0 and Rs. 5-10-0 ; those for sanitation rose from Rs. 2-9-0 to Rs. 2-10-0.

195. *Bengal Presdy.*—Total jails included 5 central, 19 districts, 3 special and 62 subsidiary with 1 borstal school. The female jail, opened in 1932 in the Berhampur district jail chiefly for the confinement of civil disobedience prisoners, remained open throughout the year. The Hijli and Dum Dum special jails were also maintained.

Total accommodation, excluding hospital and observation cells, existed for 8,151 prisoners (males 17,280 and females 871), whilst the daily average population was 21,405 (21,143 males and 262 females). The maximum population confined on any one day was 30,073 (29,287 males and 786 females). Overcrowding, which was a feature of the special jails during the previous year, was alleviated owing to the cessation of the civil disobedience movement.

There was an appreciable drop in the sick rate from 41·3 p.m. in 1932 to 35·6 p.m. ; on the other hand the death rate rose from 10·5 p.m. to 10·8 p.m. The

admission to hospital rate was 1,125·6 p.m., showing a decrease of 302·2 p.m. With the exceptions of 1930 and 1932, the death rate was the lowest on record. Barisal (28·3 p.m.), Jessore (27·1), Khulna (23·1), Darjeeling (22·8) and Pabna (20·7) recorded the highest death rates; Hijli additional special (2·5 p.m.), Dum Dum special (4·1), Berhampore (5·0) and Rajshahi (5·5) reported low rates. Cholera was responsible for 3 non-fatal cases against 6 cases and 1 death in 1932. Of these, 2 cases occurred in the Alipore central jail and one in the Ghatal sub-jail.

Malaria caused 6,216 admissions and 23 deaths; dysentery 1,063 and 17; diarrhœa 1,122 and 3; and abscess, ulcer and boil 1,026 and 1. Anæmia and debility was responsible for 356 admissions and 11 deaths; pneumonia for 179 and 43; and pulmonary tuberculosis for 90 and 26.

Dacca, Barisal, Presidency, Krishnagar, Midnapore and Rangpur jails reported most of the dysentery cases; whilst Midnapur, Dacca, Jessore, Comilla, Dinajpur, Mymensingh and Rangpur recorded high malaria admission rates.

The manufacturing section of the Presidency jail issued 49,023 lbs. of quinine and cinchona in addition to 132,369 boxes of quinine treatments as against 45,152 lbs. and 91,275 boxes in 1932. The sale proceeds of all products amounted to Rs. 9,32,275.

The Bengal After-Care Association continued to do useful work.

Dietary charges per head fell from Rs. 48-6-0 to Rs. 41-0-0; hospital charges from Rs. 8-7 to Rs. 8-1, clothing and bedding charges from Rs. 7-10 to Rs. 4-12; and sanitation charges from Rs. 3-13 to Rs. 3-1.

Expenditure on jail buildings amounted to Rs. 2,76,231, this figure including Rs. 1,25,627 on original works.

196. *C. P. and Berar.*—Two central, 10 district and 9 subsidiary jails, excluding hospital and observation cells, continued to provide accommodation for 6,518 prisoners. Owing to the subsidence of the civil disobedience movement, the daily average prison population fell from 5,665 to 4,901.

The Narsinghpur Borstal Institution continued to do useful work in training and reforming boy prisoners. The Borstal Act was enforced in Berar from January, 1933.

Owing to the decrease in prison population, the number of admissions to hospital declined from 1,866 in 1932 to 1,339 and the daily average sick rate from 62·1 p.m. to 47·8 p.m. As the total deaths (46) were the same as in 1932, the death rate was higher at 9·4 p.m. The gain in weight shown by large numbers of prisoners after admission is testimony of the care taken over the health and diet.

Cholera was absent.

Dysentery admissions numbered 102; malaria 185; pneumonia 33; diarrhœa 53; and tuberculosis of the lungs 35 with 11 deaths.

The Nagpur central jail continued to meet the steady increase in demand for quinine and cinchona as is evident from the following statement :—

TABLE X (*v*).

	1930. lbs.	1931. lbs.	1932. lbs.	1933. lbs.
Quinine sulphate . . .	534	560	562	**641**
Cinchona febrifuge . . .	514	540	591	**619**
Quinine hydrochloride . . .	23	26	24	**29**
4 grain quinine tablets . .	312	256	213	**329**
2 grain quinine tablets . .	6	14	14	**17**
5 grain cinchona tablets . .	154	152	158	**185**
Quinine boxes containing 40 treatments.	2,678	3,057	2,626	**2,965**

The Discharged Prisoners' Aid Societies at Nagpur and Amraoti continued to do useful work.

Dietary, clothing and bedding charges were all lower but some increase occurred, in sanitation charges.

197. *Bombay Presdy.*—Owing to the cessation of the civil disobedience movement, the average daily population dropped appreciably from 19,100 to 16,251. Although the Children's Act, a Reformatory School Act and a Borstal Act were in force, adolescent admissions between the ages of 16 and 21 fell to 2,549 males and 168 females; admissions of juveniles and children numbered 2,717 and 69. The temporary jails opened in 1932 to accommodate the excess population, were closed and this reduced the available accommodation from 23,186 to 20,118 (17,387 males and 2,731 females). A scheme for the permanent retention of the Visapur temporary prison as an extramural farm was under consideration of Government.

Table X (*vi*) shows the jails where the daily average population exceeded the total available accommodation :—

TABLE X (*vi*).

	Authorised accommodation.	Daily average population.
H. M.'s House of Correction	244	275
Bijapur district	345	433
Ahmedabad central	1,261	1,626
Hyderabad central	1,526	1,604
Sukkur district	448	501
Shikarpur special	464	494

The admission and death rates rose from 647·2 p.m. and 7·1 p.m. in 1932 to 701·8 p.m. and 10·7 p.m. On the other hand, the daily average sick rate showed a small decrease from 19·8 p.m. to 19·7 p.m. The higher death rate was due to an increase of 35 deaths in the Sind jails, particularly the Shikarpur special prison which recorded the high rate of 44·5 p.m.

Cholera and plague were absent; smallpox admissions numbered 6, mumps 155, influenza 41, chicken-pox 22 and scurvy 6.

Cerebro-spinal fever was confined to the Sind jails which recorded 26 admissions and 20 deaths (10 and 9 in 1932). Detailed figures are : Hyderabad central 3 and 3; Sukkur district 1 and *nil*; Shikarpur special 14 and 11, and Sind convict gang 8 and 6.

Enteric fevers were responsible for 30 admissions with 6 deaths, but none of these occurred in the Visapur temporary prison. In the Ahmedabad central jail there were 72 admissions for catarrhal jaundice and 61 for epidemic catarrhal jaundice.

Admissions and deaths due to tuberculosis numbered 52 and 19.

Malaria was the cause of 3,932 admissions with 7 deaths. The Visapur temporary prison alone recorded 1,034 admissions, of which 477 cases were admitted to hospital once, 138 twice, 55 thrice, 15 four times, 3 five and six times each, 2 seven times and 1 nine times. The majority of fresh infections occurred in prisoners received as transfers from Bombay and Karwar; of these 277 gave a previous history of malaria and on admission to jail were found to have enlarged and tender spleens. The increase of cases at Arthur Road from 38 to 61 was ascribed to the existence of numerous mosquito breeding grounds in the immediate vicinity of the prison and to malarial reservoirs amongst the free population living in the vicinity. In Ahmedabad, the numbers rose from 88 to 277 owing to heavy and late rains, whilst the very heavy and unusual rains and post-barrage conditions

appear to have led to the very marked rise of fresh infections in all the Sind jails. This is evidenced by the following figures :—

	Admissions.	
	1932.	1933.
Karachi district	299	**322**
Hyderabad central	412	**481**
Sukkur district	16	**104**
Shikarpur special	119	**218**
Sind convict gang	103	**312**

Yeravda central reported 566 cases with 1 death as against 318 and *nil* in 1932, the increase being due to transferred prisoners bringing infection with them. Quinine tablets continued to be manufactured at the Yeravda Central Prison.

904 admissions and 5 deaths were due to dysentery and diarrhœa.

Prisoners Aid Societies continued to work in Bombay, Ahmedabad, Bijapur and Poona.

Hospital and sanitation charges per head rose from Rs. 2-6-3 and Rs. 4-8-10 to Rs. 2-8-1 and Rs. 5-9-11 ; charges for diet and clothing and bedding fell from Rs. 37-4-8 and Rs. 5-2-3 to Rs. 36-8-7 and Rs. 3-3-1.

18 male and 2 female prisoners were transferred to mental hospitals.

198. *Madras Presdy.*—The nine central, 3 district, 2 Borstal, 3 special and 300 sub-jails provided accommodation for 20,316 prisoners (18,347 males and 1,969 females) as against 25,096 (23,127 males and 1,969 females) in 1932. The daily average population, 14,761, was about 1,600 less than in the previous year owing chiefly to the suspension of the mass civil disobedience movement and to the scheme of suspension of sentences. Releases included 6 female prisoners convicted of infanticide, who were sent to the Madras Seva Sadan and the rescue home of the Salvation Army.

Although the admission and the daily average sick rates decreased by 39·5 p.m. and 1·3 p.m. to 15·4 p.m. and 336·9 p.m., the total deaths and the death rate rose from 117 and 7·3 p.m. to 144 and 9·8 p.m. respectively. Of the deaths, 37 occurred in the Trichinopoly central jail, 12 in the Vellore central, 12 in Madras Penitentiary, 10 in the Coimbatore central, 10 in the Cannanore central, 9 in Rajahmundry central, 7 in Salem central and 7 in Madura district, 6 in Bellary central and 5 in Berhampore district jail. The high death rate in Trichinopoly was ascribed to an outbreak of gastro-enteritis and bowel complaints, originating from a defective water supply.

Cholera was again absent.

Dysentery caused 432 admissions, Trichinopoly accounting for 120, Cannanore 94, Bellary 65 and Rajahmundry 59.

The number of admissions from malaria increased from 167 to 246. Of these, 158 were recorded in the Bellary central jail because of unusually heavy rains Routine anti-malarial measures were everywhere carried out.

Whilst the number of admissions from pulmonary tuberculosis fell from 83 to 61, the number of deaths rose from 19 to 24. The disease is reported to be wide-spread in all jails. The Wellesley sanatorium jail, Bellary, where all cases of tuberculosis are confined, except those unfit to travel and those in an advanced stage, registered 16 out of the 24 deaths.

Of the 101 admissions from anæmia and debility, 47 were reported from the Trichinopoly central jail.

Pneumonia was responsible for 38 cases.

Although the diagnosis of diarrhœa is always discouraged as being unscientific, 19 cases were so recorded.

Ankylostomiasis was the cause of only 18 admissions. Prisoners on admission were given a routine anthelmintic course unless this was otherwise contradicted.

Enteric cases fell from 32 to 25 admissions, Cannanore and Trichinopoly jails having 6 and 5 cases respectively.

Of the 36 cases of syphilis, 14 were in Madura and 11 in Trichinopoly.

Protected water supplies were in use in all central and district jails and Borstal schools and the conservancy system was maintained in as up-to-date a manner as possible. Drainage received attention.

The quinine section of the Madras Penitentiary jail yielded a profit of Rs. 10,609.

In the Cuddalore district jail, special arrangements exist in accordance with medical exigencies to deal with mental defectives, who were 115 in number. 165 leprous prisoners were also confined in this jail.

The curriculum of education for convicts includes ambulance and first-aid training; 841 prisoners were trained during the year. Of these 186 obtained the prescribed certificates after passing the requisite examination.

Of the 17,819 prisoners released, the Discharged Prisoners' Aid Society rendered help to 1,050.

Whilst the dieting and hospital charges fell, those on clothing and bedding and sanitation showed an increase.

199. *Assam.*—Available accommodation provided for 3,833 prisoners as against 3,873 in 1932. The Inspector-General of Prisons considers this still insufficient and his remarks deserve attention :—

" The question of accommodation continues to be very acute and it is most necessary for additional accommodation to be provided—especially cellular accommodation which is lamentably insufficient. The new barracks to be constructed this year in the Tezpur district jail will help to relieve the situation, but if health and discipline are to be maintained the requirements of each jail must be carefully gone into and the necessary cellular accommodation provided. And as I have repeatedly brought to notice, a great deal of the existing accommodation in the *kutcha* and insecure association barracks, structurally unfit for jail purposes, should be replaced at the earliest possible moment by permanent buildings of modern design."

The daily average population was 3,804, much the same as in 1932. This was ascribed to increased crime. The admission and the daily average sick and the death rates all dropped from 602 p.m., 18·7 p.m. and 27·9 p.m., to 561, 16·3 and 25·8. The provincial death rate which is said to be the highest in British India, at least compares favourably with the provincial death rate of 20·3 p.m. Taking into consideration the large number of prisoners dealt with, the constant overcrowding owing to insufficient accommodation and the fact that only 50% of the admissions were classed as in good health, the recorded vital statistics are fairly satisfactory, but there is ample room for improvement. This depends, however, on increased segregation arrangements, the necessity for which is more evident as a great many prisoners are on admission found to be suffering from chronic malaria, dysentery and other complaints common to the province.

In the Assam Valley jails 28% of the convicts were habitual drug addicts and in the Surma Valley 6%. Modimos' detoxication treatment was reported on favourably.

Malaria (409) cases and dysentery (404) continued to be the main causes of sickness; deaths included pulmonary tuberculosis (10), pneumonia (8), dysentery (6) and malaria (3). The incidence of dysentery which is rampant in the Assam jails and is of extraneous origin, was again the highest in Gauhati (225 cases).

This jail suffered from overcrowding more or less throughout the year and has practically no accommodation for segregation.

Malarial admissions diminished from 527 to 409, Sylhet recording 108.

Of the 40 admissions and 10 deaths from pulmonary tuberculosis, 14 and 2 occurred in Dibrugarh district jail.

Hookworm investigation was systematically carried out in every jail and of the 2,912 cases examined, 465 or 16% were found infected. Admissions to hospital for this disease numbered 16.

At Sylhet, the isolation hospital was practically rebuilt and a leper ward to accommodate 40 prisoners was added. At Nowgong, Gauhati and Dhubri and other places, certain drainage improvements were carried out.

Dietary charges per head fell from Rs. 37-2-6 to Rs. 32-9-2 and sanitation charges from Re. 0-12-10 to Re. 0-12-1 ; hospital and clothing and bedding charges rose from Rs. 4-5-11 and Rs. 4-7-10 to Rs. 4-9-10 and Rs. 4-15-6.

200. *Burma.*—9 central, 18 district, 2 camp and 5 subsidiary jails, provide accommodation for 22,372 prisoners. The combined Borstal and Senior Training School at Thayetmyo continued to function.

Although the daily average population for all classes of prisoners showed a slight decrease from 21,680 to 21,145, the year under review was an exceptionally heavy one for the Prison Department. The admission to hospital and the daily average sick rates which were 237·7 p.m. and 10·6 p.m. respectively were the lowest for the past 15 years. The death rate, 10·6 p.m., was the lowest on record except during 1925.

Of the 227 prisoners who died, 85 were admitted to jail in good health, 38 in bad health and 105 in indifferent health. Of these, 9 died within a week of admission ; 9 within 2 weeks ; 11 within 3 weeks ; 6 within 4 weeks ; and 192 after more than a month. 29 deaths occurred among prisoners who on admission were sent direct to hospital. 134 deaths occurred among prisoners who were between 16 and 40 years of age, 80 between 40 and 60 years and 13 among those over 60 years of age.

Cholera was again absent and only 2 deaths from plague were recorded. Smallpox was the cause of 8 admissions and one death. All new admissions are immediately vaccinated as a routine ; primary vaccinations totalled 2,569 and revaccinations 35,842.

The incidence of dysentery further decreased to 310 admissions and 16 deaths. The marked improvement under dysentery was ascribed to chlorination of water supplies which has been carried out since 1929.

Tubercular diseases were responsible for 98 admissions and 54 deaths. In the special ward at Myingyan, which has accommodation for 50 prisoners, 63 cases were admitted. Of these 15 died, 6 within one month, 4 within 2 months and 5 after 5 months of admission.

30 admissions and 6 deaths were ascribed to enteric fever.

Beri-beri was responsible for 12 admissions and influenza for 341. A further decrease in malaria was recorded, the admission to hospital rate being 20 p.m. as compared with 24·7 p.m. in 1932, 40·6 p.m. in 1931 and 68·2 p.m. in 1930.

Admissions from ankylostomiasis numbered 1,010. All new admissions were, as usual, examined for ankylostoma infection.

5·6% of the convict population were opium addicts.

Classes in first-aid were held in the jails at Akyab, Rangoon, Insein, Bassein, Myingyan, Paungde, Toungoo and Meiktila. Of the 24 jailors, 53 warders and 129 prisoners trained, 11, 29 and 57 respectively passed the prescribed test.

Dietary, hospital and clothing and bedding charges were lower ; those for sanitation increased.

Improvements in water supplies carried out or sanctioned during the year included a water-supply scheme for the Bassein central jail at a cost of Rs. 17,329. As regards conservancy, the dry earth system was in use ; but bore-hole latrines were under experiment in the Mokpalin camp jail.

201. *Andamans.*—The daily average population numbered 6,527 males and 96 females as against 7,304 and 119 respectively in 1932. The barracks, allowing 50 superficial feet per prisoner, had accommodation for a total of 4,245 (4,185 males and 60 females).

The maximum population confined on any one day was 7,245—male 7,139 and female 106. Owing to the increasing popularity of the Indian women and children's hospital at Atlanta Point, an out-patient department was added at a cost of Rs. 1,065. The hospital is equipped with an operation theatre, labour room, gynæcological room and wards. In addition, separate wards exist for general diseases of women and children.

A total of 3,654 admissions to hospital was recorded with 118 deaths. The average sick rate was 26·7 p.m. and the death rate 17·8 p.m.

The general health of the Settlement was good. Malaria was mostly confined to convicts. Admissions declined from 1,803 to 1,621, this being mainly due to energetic preventive measures which included strict surveillance of highly malarious areas and quinine prophylaxis.

Cholera was again absent.

Dysentery caused 162 admissions.

Enteric fever was responsible for 7 admissions as compared with 29 in 1932, 3 among convicts and 4 among the free population. Of these, 4 were paratyphoid A and 3 paratyphoid B cases. Disinfection of water supplies and improvements in sanitation are said to have yielded encouraging results.

36 admissions and 8 deaths were recorded from Weil's disease as compared with 25 and 8 in 1932. The disease is reported to be endemic, the period of infectivity being highest during the rainy months from June to October.

Influenza was responsible for 93 mild cases.

Pulmonary tuberculosis was the cause of 36 attacks and 14 deaths, and 20 cases which were likely to benefit from a change were repatriated to Indian jails.

Anæmia accounted for 77 admissions. The 16 deaths recorded under this head are said to have been due to post-malarial cachexia and dysentery.

118 admissions and 7 deaths were recorded from colitis.

Other infectious diseases included smallpox 8 cases, chicken-pox 4, measles 2 and mumps 7. Acute infectious cases are transferred to the segregation camp at Bamboo Flat.

Vaccinations performed numbered 3,735, of which 127 were primary, 47 secondary and 3,561 re-vaccinations.

A total of 37 mental cases were treated in the Haddo hospital : these included mania 9, melancholia 6, circular insanity 2, delusional insanity 4, post-febrile insanity 2, dementia 2 and other types 11.

Food and water supplies were satisfactory and sanitation and conservancy received greater attention.

202. *Aden and Coorg.*—These reports contained various items of value and interest, but no detailed comment seems necessary.

Conclusion.

203. One feature to be noted from this summary for 1933 is the continuation of overcrowding in certain provincial jails in spite of the cessation of the civil disobedience movement. Whilst the admission to hospital rate and the constantly sick rate were both lower than those for 1932 and for the decennial mean,

the general death rate increased slightly from 11·2 p.m. in 1932 to 11·5. This seems to have been largely due to the admission of many prisoners in a debilitated state of health and to the prevalence of dysentery in certain areas.

In contradistinction to 1932, during the year under review, the three major epidemic diseases were widely prevalent among the general population of the country. The danger of introduction of these infectious diseases into the jails was therefore markedly increased and it speaks well for the assiduous care practised by those responsible for jail administration that the incidence of infectious disease continued to fall and that the death rate was maintained near the low figure which has been recorded in recent years for the jail population in this country.

SECTION XI.

INDIAN VOLUNTARY HEALTH ORGANISATIONS.

The Indian Red Cross Society.*

204. In January, 1933, the Meo disturbances occurred in Alwar State and Indian Red Cross Society was for the first time since its foundation mobilized at the request of the military authorities. The Society sent medical supplies and anti-tetanus serum for the treatment of wounded civilians and also arranged for the transport to hospital of serious cases.

Membership.—Adult members at the end of the year totalled 12,500 compared with 13,373 at the end of 1932. Income from subscriptions, however, was maintained owing to an increase of membership among the higher grades (life members and life associates). The members enrolled included three Vice-Presidents who each contributed over Rs. 10,000 to the funds. The honour of enrolling the highest number of members (5,575) still rests with the Punjab.

Junior Red Cross membership statistics showed an encouraging increase, the number of school groups having risen from 3,781 in 1932 to 5,297 at the end of 1933, while the number of members increased from 192,516 to 252,941.

Maternity and Child-Welfare Bureau.—Dr. Ruth Young, M.B.E., W.M.S., continued as Director of the Bureau ; during her absence on leave for three months the services of Dr. J. M. Orkney, W. M. S., were generously lent by the Countess of Dufferin's Fund.

On the whole, voluntary child-welfare work has not suffered as severe a set-back as might have been expected from the depression and practically no centres have been closed down. The Bureau continued to support four health schools (in Delhi, Calcutta, Poona and Madras) all of which are training health visitors. The Lane School of Mothercraft, Bareilly, which trains Indian girls in mothercraft, also received a subsidy.

The report on the Victoria Memorial Scholarships Fund, which is administered by the Bureau and spent on the training of indigenous *dais*, states that there is an increasing tendency to concentrate the *dais* in schools where they can be given longer training, whilst a school attracts a better class of woman. The number under training during 1933 was 714 indigenous *dais* and 144 others, excluding the Punjab for which information has not been received. The Army Child Welfare work continued to increase in popularity and in 1933 a grant of Rs. 50,000 was received from the Indian Expeditionary Force Canteen Profits Fund, which will be spent on permanent work such as buildings and equipment. This will be a great boon to many centres which are struggling along on small incomes and have no reserve for capital expenditure. A conference on welfare work in the army was held in February in Delhi and was attended by 23 delegates.

King George Thanksgiving (Anti-Tuberculosis) Fund.—The King George Thanksgiving (Anti-Tuberculosis) Fund is the nucleus of anti-tuberculosis activities in India and with the limited resources at its disposal it directs

*Prepared from a note supplied by Miss Norah Hill, A. R. R. C., Secretary, Indian Red Cross Society.

its energies to bring home to the public the immensity and urgency of the problem and does what it can to educate the public in preventive measures both individual and public.

At the end of 1933, 15 provincial and state anti-tuberculosis committees were in receipt of grants from the Fund. These committees include public-spirited men of all shades of opinion, members of the education and public health departments and non-officials interested in the welfare of the people in general and in the anti-tuberculosis campaign in particular. These provincial anti-tuberculosis committees are carrying out an intensive propaganda campaign by free distribution of leaflets, pamphlets, charts and by lectures and demonstrations. In addition to spreading such knowledge and creating a public conscience, some of the branch committees are carrying out other useful schemes which have a bearing on the problem of tuberculosis.

The Fund has published a large amount of propaganda material. Its pamphlets, charts, picture-posters, etc., are in great demand and have been distributed through the kind offices of the Provincial Anti-tuberculosis Committees and through Inspectors-General of Civil Hospitals, Directors of Public Health, Directors of Public Instruction, Chief Medical Officers of Indian States and Railways, Superintendents of Sanatoria and Principals of Medical Colleges and Schools.

The Fund aims at improving the training of medical students and practitioners so as to equip them to diagnose the disease early and to give their patients the benefit of up-to-date treatment. With this end in view, grants were made to several medical schools and colleges and also to the Mary Wilson Sanatorium, Tilaunia (Rajputana) for special training in tuberculosis to nurses.

The Fund is a member of the International Union against Tuberculosis and Dr. A. R. Mehta, the Organising Secretary, and Dr. Jiv Raj Mehta of Bombay continued to be nominated councillors. During 1933, the Italian Fascist National Federation against Tuberculosis placed at the disposal of the International Union against Tuberculosis, two scholarships at the Benito Mussolini Institute in Rome, each of the value of 6,000 liras *plus* board and lodging, These scholarships are awarded to foreign medical practitioners recommended by the Government or a National Society belonging to the Union for the purpose of following a course of studies in tuberculosis. Dr. T. J. Joseph, a member of the staff of the Union Mission Tuberculosis Sanatorium, Arogyavaram (South India) was selected by the Union for one of these scholarships.

The Organising Secretary of the Fund undertook a number of lecture tours and during the year under report visited Sind, Bombay Presidency, Mysore State, Rajputana and the Punjab.

The Fund awards the Hassan Masud Suhrawardy Anti-Tuberculosis Challenge Shield to the Corporation, Municipal Council or Municipal Committee in British India, Burma or Indian States doing anti-tuberculosis work. This Shield was awarded to the Mysore City Municipal Council for having shown the best anti-tuberculosis activities during 1933.

Junior Red Cross.—Dr. Hamid, D. P. H., continued to hold the office of Director, during the year. This movement continued to spread both in the provinces and in Indian States but progress was most marked in the Punjab, U. P., Delhi and Assam Provinces and in Baroda, Jodhpur and Kotah States. Junior groups were enrolled for the first time in Bengal, Baluchistan and Kotah

State. Better progress was made in girls' schools and the Punjab Branch appointed Dr. D. C. Wilson as whole-time organiser for Junior Red Cross health activities in these institutions.

New Junior publications issued included two pamphlets (one illustrated) on "The Prevention of Blindness", a leaflet entitled "Junior Red Cross; What it is, What it does", and illustrated "Hygiene Lecture Note-Book", a "Collection of Dramas, Dialogues, etc., on Health", and a "Rules of the Health Game" poster. The blindness pamphlets were translated into Gujrati by the Baroda State Branch. A new set of 44 coloured slides on "School Hygiene" and another set of 32 coloured slides on "Prevention of Blindness" were prepared.

A competition for Junior groups was organized for the best poster illustrating one of the health rules, for which 40 entries were received. The U. P. Branch also organized a provincial health poster competition, while the Punjab Branch held its usual health essay competition.

The main activities of Junior groups were the practice of health habits, the organization of midday lunches of sprouted gram, stimulation of school medical inspection, maintenance of school first-aid cupboards, assistance in relief activities during floods, etc. Throughout the year special emphasis was laid on propaganda for the prevention of blindness.

Popular health propaganda by means of films, lantern lectures, posters, and pamphlets is one of the Society's principal activities. During 1933 a Cinema Production Bureau was opened at headquarters in a special building and work was started on a film entitled "The Prevention of Blindness". Films produced elsewhere will also be copied and vernacular titles will be inserted in films from abroad. Three new films "Lost and Found" (3 reels on venereal diseases), "The Coated Pill" (3 reels on malaria) and "The Gift of life" (4 reels on social hygiene) were purchased. The cinema promises to become a powerful aid in health propaganda in India.

The Society's quarterly journal, "*The Red Cross*", had a successful year and is now self-supporting. Some of the provincial branches showed great initiative in health propaganda. A "Health Mela" was held in Ajmer. The U. P. Branch used radio to attract audiences and also engaged local speakers to explain health film captions to illiterate audiences. Three branches,—the Punjab, the U. P. and Mysore State,—put up Red Cross health exhibits at industrial exhibitions.

The medical stores section of the Red Cross Depot has been closed down, as stores are usually obtainable locally, but the literature section becomes increasingly busy from year to year. Over Rs. 15,000 worth of health propaganda and Red Cross literature was sold during the year besides a large amount distributed free. There was a steady demand for health posters and lantern slides.

Besides the assistance given in the Meo disturbances, the Society gave active help both in cash and kind during the floods in the Punjab, Delhi Province and Bihar and Orissa. Almost all Red Cross branches make annual donations to hospitals for the purchase of medical comforts. Sometimes extra equipment is provided and sometimes the Red Cross pays the salaries of additional nursing staff. The Assam Branch in 1933 took the initiative in collecting funds for a new Women's and Children's Hospital in Shillong.

Red Cross branches have three main avenues of penetration to villages: through their midwives and health visitors, through their Junior Red Cross groups in schools and through their travelling dispensaries. Both the Punjab and U. P. branches are doing a large amount of rural midwifery work and have a number of village centres. Sind has a scheme for attaching a trained *dai* to every local dispensary. Bombay finances travelling dispensaries which tour the villages and do educational propaganda.

The St. John Ambulance Association (Indian Council) and the St. John Ambulance Brigade Overseas.*

205. The work of the Association in spreading knowledge of first-aid, home nursing, hygiene, and mothercraft has made steady progress in spite of continued financial difficulties, thanks to the public spirit of a large band of voluntary workers.

During 1933, 1,583 courses of instruction were attended by 22,853 persons of whom 13,957 qualified for certificates. The new course in "Domestic Hygiene and Mothercraft", introduced in 1932, has not yet made much headway, but the fact that many educational authorities have recommended the text-book for use in girls' schools is encouraging. The difficulty is in obtaining qualified instructors. The Mackenzie School Course in first-aid, hygiene and sanitation continues to grow in popularity, and 9,919 students were instructed, compared with 8,576 in 1932, and 6,089 were awarded certificates. Classes were organised as usual amongst military forces, railway employees, police, prisons, reformatory schools, criminal tribes, educational institutions, State forces, miners and industrial establishments. Classes in first-aid were for the first time organised in the oil-fields of the Burma Oil Company. A total of 15,801 text-books in English and the vernaculars were issued from the St. John Ambulance Depot, Lahore. The Home Nursing Manual for Indian Women was translated into Assamese.

Another first-aid road station was opened by the Bengal provincial centre in Calcutta in March. A total of 705 cases were treated at the two stations.

Provincial ambulance competitions were held during the year by the Bengal, U. P., Punjab, Rajputana and Bombay provincial centres, by the Mysore State centre and by the railway centres of Eastern Bengal, East Indian, Great Indian Peninsula and North Western Railways.

The St. John Ambulance Brigade Overseas (*Empire of India*).—A further increase in the strength of the Brigade from 69 to 72 divisions occurred during 1933. These divisions included 52 Ambulance divisions; 10 Nursing divisions; 5 Cadet Ambulance divisions; 5 Cadet Nursing divisions. The total membership was 1,868 men, 188 women, 124 boys and 137 girls, all of whom obtained the Association's certificates prior to joining their divisions.

Useful service was rendered in the case of accidents, at important religious and other festivals, in the medical inspection of girls' schools, and in vaccination and inoculation campaigns during epidemics.

*Prepared from a note supplied by Miss Norah Hill, A. R. R. C., Secretary, St. John Ambulance Association (Indian Council) and the St. John Ambulance Brigade Overseas.

British Empire Leprosy Relief Association.*

206. The activities of the British Empire Leprosy Relief Association have, as in previous years, been carried on according to a scheme in which the Indian Council on the one hand and its 17 provincial and state branches on the other have apportioned between themselves the approved items in the campaign against leprosy which the Association has set up in India.

The only available income is the revenue of the Endowment Fund established in 1925, as the result of an appeal inaugurated by Lord Reading, the then Viceroy and Governor General of India. This income, which is wholly derived from interest on Government securities, has been permanently reduced from Rs. 1,22,526 to Rs. 1,11,601 as a result of the conversion schemes adopted by the Government of India in respect of its various Loans.

The leprosy campaign includes the promotion of research into the various phases of the disease and its treatment; the training of doctors in the latest methods of diagnosis and treatment; publicity and propaganda by the issue of educational pamphlets, posters, slides, films, etc.; surveys to determine incidence and endemicity; and the establishment and maintenance of clinics for the treatment of leprous patients. The Association's activities in these directions have placed at the disposal of research workers, public health officers and social workers data of considerable value and importance. During 1933, a sum of Rs. 28,587 was spent on research conducted in the School of Tropical Medicine and Hygiene under Dr. E. Muir. Investigations relating to the pathology, bacteriology and immunology of the disease were carried out and the results published in the medical journals. The total expenditure at the headquarters of the Indian Council, including grants for research, was Rs. 54,117 and of the balance of the income a sum of Rs. 56,450 was distributed to provincial and State branches for the promotion of local activities.

Two all-India conferences and one provincial conference in Madras were held at which the recommendations of the Leprosy Commission of the League of Nations were discussed and schemes for carrying them out were outlined in directions suited to Indian conditions. The first result of these labours was the establishment of a rural investigation centre in Bankura in Bengal with the objects (*a*) of testing the possibility of controlling leprosy in a limited area by means of concentrated work; and (*b*) of investigating the epidemiology of the disease by the careful study of the spread of the disease in villages over a prolonged period.

56 doctors received a course of training in Calcutta; these were all either directly engaged in anti-leprosy work or held administrative appointments in areas where leprosy is endemic.

The provincial branches mainly occupied themselves with providing treatment to leprous patients and a large number of new leprosy clinics were established. In Assam, the number of clinics rose from 81 in 1932 to 145; B. & O., Bombay, Bengal, Punjab and Burma also recorded increases; in other provinces even where no new clinics were opened, the number of lepers treated increased considerably. The Assam branch reported 39 cases cured; 276 clinical and 30 absolute cures were reported from Bombay; the Punjab reported 18 relatively cured, 44 much improved and 58 improved out of 206 cases treated while only 5 got worse; and in

*Prepared from a note supplied by Sardar Bahadur Balwant Singh Puri, O.B.E., Honorary Secretary, British Empire Leprosy Relief Association (Indian Council).

the C. P. treatment resulted in rendering 259 cases "symptom free", while 770 showed great improvement. Similar evidence exists wherever clinics have been established. In Madras, the already remarkable position in the matter of clinics and their activities was further improved. The number of clinics rose from 219 in 1932 to 322 at the end of 1933 and attendances from 3,80,050 to 5,26,046, including 30,760 new cases treated. In the district of Salem alone, 13 new clinics were established bringing the total to 41 at which the total attendances reached the figure of 1,23,248, whilst propaganda and social work also achieved remarkable success. A District Leprosy Relief Council to finance all the leprosy clinics was organised and social committees were attached to each clinic for social work and hygienic education. As a direct result of these efforts, the public subscribed liberally towards the maintenance of the work.

The survey work being done in Bengal, under the supervision of Dr. E. Muir, is of special importance and valuable data have been collected with regard to the incidence and endemicity of the disease in the province. The experimental survey instituted in B. & O. to estimate the relative importance of dietetic and medical treatment of the leper has provided much useful information. In Assam, 1,314 cases were detected in a limited area; in Bengal, apart from the provincial survey, 25,895 students in 31 Calcutta schools were examined and 109 were found to be leprous. Similarly, in the C. P., the examination of 10,907 students in 175 schools revealed 49 suffering from leprosy. In Burma, it has been shown that the incidence of leprosy is twelve times higher than that given in the last census. In Dacca in Bengal, one out of twelve families was found affected with leprosy. The disease has been found to exist in most unexpected quarters and this discovery has emphasised the difficulties of the anti-leprosy campaign. Lectures to medical students have been arranged wherever possible and lantern lectures and illustrated talks have been given during festive gatherings. Steps have been taken to improve leper homes.

The leper is slowly beginning to feel that he is not an outcast, that his life is not doomed, but that his disease is curable and that his return to a life of usefulness is not an impossibility. That the Indian Council of the Association has been able to play some part in bringing a ray of hope into the minds of a class of persons suffering from age-long depression and distress is not only a great satisfaction but encourages optimism in regard to the future of the Association and of the afflicted part of the population it seeks to assist.

The Countess of Dufferin Fund and Women's Medical Service.
Lady Minto's Indian Nursing Association.
The Bombay Presidency Baby and Health Week Association.

207. The activities of these Associations for 1933 were given brief mention on pages 319-21 of this report for last year.

Other Indian Voluntary Health Societies.

208. Most of these are local or provincial societies unconnected with any all-India or central organization. They do much useful work at *melas* and in epidemics and assist at health and baby weeks, and in maternity and child welfare work. Their existence and the initiative and interest shown by their members are healthy signs of a developing public conscience; moreover, they

show the determination of local communities to help themselves, a more important public health asset than can be attained by legislation or coercion. The services they render are much appreciated both by the public and by official departments and they all deserve encouragement.

The activities of these voluntary associations are adapted to the area and population they serve and include first-aid, social work, maternity and child welfare, sanitation, physical education, village uplift, village reconstruction work such as care and construction of roads, drains and cleaning of jungles, health and educational propaganda, the training of *dais*, uplift of women and the provision of medical relief.

Health Propaganda Board, Madras.

This Board was constituted in 1921 for the purpose of stimulating and promoting an interest in and a knowledge of all matters connected with the general and personal health of the population of Southern India ; for the encouragement of sanitary and hygienic habits among all classes of the people ; for the diffusion of information concerning epidemics and the means of combating them ; and for other objects cognate to the promotion of the public health. During the year it produced a film on tuberculosis at a total cost of Rs. 1,850 ; it added books and journals relating to public health to its library ; it arranged lectures and printed publications on public health and lent its propaganda materials to different institutes.

The National Health Association of Southern India, Madras.

During the year ending September, 1933, the Association carried on its usual activities including health propaganda in and around Madras city and the holding of a health essay competition, whilst it rendered assistance to local bodies in the *moffusil* and social service institutions in the city, by lending propaganda materials. A new set of charts on venereal diseases was also prepared.

The Central Co-operative Anti-Malaria Society, Limited.

This Society is a purely non-official organisation for improving the sanitary condition of the villages of Bengal and is supported by voluntary contributions. Its aims and objects are :—

(1) To organise or help in the organisation of a net-work of autonomous co-operative anti-malaria and public health societies throughout Bengal for taking measures for eradication of epidemic diseases and to group these societies together for effecting larger sanitary measures and medical relief.

(2) To initiate and guide rural societies, to take preventive measures against malaria, kala-azar, cholera, smallpox, tuberculosis, leprosy and other preventible diseases and to make sanitary improvements of their respective villages.

(3) To carry on propaganda work in furtherance of the aims and objects of the society.

(4) To provide for a regular and efficient system of guidance and supervision over the rural societies as far as funds permit.

(5) To act generally as an expert advisory body and guide to these public health societies and to further their interests in every way without assuming any controlling authority.

(6) To organise branches of the central society at suitable centres such as district or sub-divisional headquarters in furtherance of the objects of the society.

(7) To co-operate with organisations having similar motives.

The Society did useful work during the year under report in the line of anti-malarial operations on a co-operative basis.

Saroj Nalini Dutt Memorial Association.

This Association amongst its other objects carried out useful public health work. A systematic campaign was carried on by the Mahila Samitis under the Association with the object of familiarising village women with up-to-date ideas on sanitation, hygiene and public health. Series of lectures on public health and hygiene were delivered in the Ulipur Mahila Samiti throughout the year. The Mymensingh Mahila Samiti also arranged lectures on health at different centres in the town. The Association started a nursing class, which was attended by 30 women. The Rangoon Mahila Samiti organised a course of 12 lectures on Junior First-Aid. Health lectures were also organised by Mahila Samitis under the Association at Tallah, Senhati, Jessore, Bagerhat, Kashba, Lohagara, Ballygunj and other places.

Mahila Samitis under the Association also took a prominent part in promoting the health of mothers and children. A few also succeeded in establishing permanent maternity wards at their respective centres, thereby providing a long-felt need.

SECTION XII.

MISCELLANEOUS.

Legislative Progress since 1919.

209. In view of the impending introduction of further constitutional reforms, it has been thought desirable to prepare a summary of the progress made in the field of public health legislation in the provinces since 1919 at which date the 'transfer' of public health to provincial ministers was effected. Before going further I desire to express here my grateful thanks to provincial Directors of Public Health for their willing co-operation in providing the material for this resumé; without that co-operation it could not have been prepared. As might have been expected, there has been no uniformity in the legislative activity of the different provinces so that it has been found impracticable to discuss general developments under a series of public health headings. Each province has therefore been taken up separately, but it is hoped that even in this form a general picture will be obtained of the advances made during the past 16 years throughout India. These advances in certain respects may be thought leisurely, but they are by no means negligible and the position today is certainly a great improvement over that which existed in 1919. The one great defect is the absence of an All-India Public Health Act laying down in general terms the principles on which public health development should be based. This legislative measure will apparently have to await the formation of a Central Ministry of Health, but that essential feature of a reformed Government of India has not yet received the consideration which it merits. Four minor administrations have been dealt with in the first place and the remaining paragraphs give details of the legislative advances made in the major provinces.

N.-W. F. P.—Although the 1919 reforms were not introduced in this province until 1932 the local administration framed in 1931 its own "Pure Food Rules" under the Punjab Pure Food Act (Act VIII of 1929) which had been extended to the N.-W. F. P. in 1930. Under these rules, a Public Analyst has been appointed and municipal M. O. Hs. and medical officers of hospitals, where no M. O. Hs. are employed, have been appointed as food inspectors. In 1933, an amendment to the Punjab Municipal Act, 1911, but applicable only to the N.-W. F. P., was passed by the Legislature. This amendment empowered municipal committees to prohibit the keeping of brothels and public prostitutes within municipal limits or in specified parts of municipal towns. This province has had little opportunity so far of dealing with public health legislation but the necessity for advance in many important directions is obvious.

Delhi.—As in the case of the N.-W. F. P., the legislative requirements of this small province have been met by adoption of the Punjab Acts. In consequence independent activity has been slight. The Punjab Municipal Amendment Act of 1923 was introduced in 1925 and the Punjab Pure Food and Drugs Act of 1929 in 1932. In 1927, regulations were issued under the Punjab District Boards Act, 1883, with a view to the appointment of committees charged with the execution of sanitary improvements in rural areas. An amendment to the Punjab Municipal Act, 1911, was made for the better control of the sale of food and drink supplies. The question of further amendment of the same Act in order to ensure isolation of cases of dangerous infectious disease or alternatively the framing of a separate Municipalities Act is now under consideration.

Coorg.—In 1927, under Section 2 of the Epidemic Diseases Act, 1897, the " Coorg Plague Regulations " were issued to ensure better prevention of the spread or importation of plague. The only other important measure is the Coorg Registration of Births and Deaths Act, 1932, Act II, whose object is to ensure more accurate vital statistics.

Ajmer-Merwara.—In order to regulate the conditions for the grant of license for the sale of medicines, drugs or articles of food or drink for human consumption, etc., byelaws under the Cantonments Acts, 1924 (Act II of 1924) were enforced in Nasirabad cantonment in 1924. The local administration have framed no rules for the prevention of food adulteration, but the Punjab Pure Food Act, 1929, has been applied from July, 1932, to Ajmer municipality ; and the Bombay Maternity Benefit Act, 1929, has been extended to the whole of Ajmer-Merwara in 1933. The Ajmer-Merwara Municipality Regulation, No. VI of 1925, has been in force in all municipalities since 1926, but this is now under revision.

Punjab.—In this province the most noteworthy legislative measures have been the Small Towns Act, 1921, with amending Acts of 1925 and 1926, and the Village Panchayat Act, 1921. The former empowers Deputy Commissioners to require town committees to provide essential sanitary services and to improve existing sanitary arrangements ; the latter devolves similar functions on the village panchayats formed under the Act. The Punjab Town Improvement Act of 1922 deals with overcrowding and sanitary improvements under such heads as building sites, ventilation, water supply, drainage, conservancy and housing of industrial labour. It also permits Improvement Trusts to exercise the same powers as municipal committees in regard to these matters. The Municipal Act was amended in 1931 in order to permit of the delegation to executive municipal officers of powers to act in regard to the sanitary sections without reference to municipal committees. In 1933, further important amendments were made to the same Act. The local Government was given power to insist on a more strict application of the sanitary provisions ; both the local Government and municipal committees were given wider powers in regard to the framing and enforcement of building and town-planning regulations ; the definition of M. O. H. was widened to include all classes of health officers in charge of public health ; a wider delegation of powers was given to municipal M. O. Hs. as regards the enforcement of the sanitary provisions in the Act ; and a further amendment empowered the Government to enforce the provision of infectious diseases hospitals where none was in existence. Other legislative advance in this province included the Punjab Pure Food Act, 1929, which made more effective and comprehensive the Adulteration of Food Act which had originally become law in 1919 ; the Nurses Registration Act of 1932 ; and the Vaccination Law (Amendment) Acts of 1925 and 1929 which amended the Vaccination Act of 1880 in two directions—(*a*) enforcement of vaccination in small town areas and (*b*) empowering district boards to extend the Act to rural areas.

U. P.—Under the Town Improvement Act VIII of 1919 a number of Improvement Trusts have been formed and these bodies have been able in certain instances to initiate and carry through schemes for sanitary betterment, for town planning and for rehousing. The Village Panchayat Act VI of 1920 gave to panchayats formed under that Act powers to carry out improvements in village sanitation, etc., similar to those contained in the Village Sanitation Act of 1892. In 1922, the District Boards Act (X of 1922) was passed, repealing the old Act and containing public health provisions and

powers to frame regulations and byelaws similar to those in the Municipalities Act (Act II of 1916). An amending Act was passed in 1930 under which the powers previously held by district board secretaries were transferred to M. O. Hs. in respect of the staffs employed on conservancy, vaccination, registration and public health generally. The Village Sanitation Act, 1892, was largely amended by Act V of 1929 in order to empower district boards to carry out sanitary improvements, such as repairs to and construction of wells, and to take emergent action in regard to epidemics. Further amendments removed the limitation of application of the previous Act to villages with populations above 2,000 and required district boards to frame byelaws under various provisions included in the Act. Although the main public health provisions of the Municipalities Act of 1916 (II of 1916) have undergone little change, an important amendment which ensures security of tenure to M. O. Hs. was passed in 1932. In view of the Government's decision to provincialise the health officers' cadre under the Amendment Act, the Government has reserved to itself the powers of appointment, punishment and dismissal of these officers. In municipalities employing whole-time M. O. Hs., these officers, notwithstanding the reservation of powers to executive officers, can, with the concurrence in writing of the executive officers, exercise powers in regard to (1) the grant or withdrawal of permits and licenses other than those for markets and slaughter houses and (2) conservancy, sanitation, drainage and the staff employed in connection with these services and with public health, vaccination and registration. The Town Areas Act, 1914 (Act II of 1914), has been amended from time to time and now has transferred the control of sanitation, lighting, and other town improvements from district magistrates to the town panchayats. In the field of sanitation and public health, the district M. O. Hs., are intimately associated with the whole of the public health activities. The Prevention of Adulteration Act (Act VI of 1912) was amended to meet the situation created by the importation of vegetable products used for adulterating *ghee* and to ensure more effective control of adulteration of foods and drugs in general. In 1934 an Act was passed enforcing the registration of nurses, midwives, assistant midwives and health visitors. The preparation and maintenance of the registers have been entrusted to a " Nurses and Midwives Council ".

B. & O.—The Food Adulteration Act, 1919, which is permissive has now been made applicable to nearly every municipality but so far has not been extended to rural areas. This Act was amended in 1933 to include in the preamble the words " and drugs ". The Municipal (Sanitary Officers) Act, 1920 requires the Commissioner of every municipality having an income of Rs. 10,000 or over to appoint (*i*) a M. O. H., (*ii*) a M. O. H. and one or more sanitary inspectors, or (*iii*) one or more sanitary inspectors. This Act vests the local Government with the power of prescribing the requisite qualifications and of fixing the salaries to be paid to these officers. No M. O. H. so appointed can be dismissed without the approval of Government. The Places of Pilgrimage Act, 1920, restricts the accommodation of pilgrims to licensed lodging houses which, under the provisions of the Act, are not only inspected but must be certified to be fit for residential purposes by the M. O. H. This Act further provides for a lodging house fund formed out of the proceeds of a terminal tax imposed on all pilgrims and used to meet the cost of public health staffs including the M. O. H. The Mining Settlements Act, 1920, provides for the formation of Mines ' Board of Health whose functions include general sanitary control and improvements and prevention of the outbreak and spread of epidemics in Mining Settlements. The Village Administration Act aims at the

development of rural self-government and empowers the local Government to declare any local area a "union" or a "panchayat" circle. The local bodies so formed control conservancy and sanitation, including drainage and the prevention of public nuisances, water supply, medical relief, registration, etc.

The Local Self-Government Act, 1885, was modified in 1923. The amended Act requires every district board to provide for the proper sanitation of the district and to appoint a sanitation committee, a health officer and a subordinate health staff. The power to exempt a local body from the appointment of a health officer lies with the local Government. In 1926, the local Government prescribed the qualifications required for appointment of district health officers, health inspectors and vaccinators. The Municipal Act of 1922 consolidated all existing municipal legislation but was further amended in 1930. Under the amended Act, Commissioners of municipalities are made responsible for conservancy and drainage arrangements, sufficiency of water supplies, removal of nuisances, enforcement of rules, the improvement of milk supplies, vaccination and for control of epidemics. Rules issued in 1929, under section 37 of the Indian Factories Act, 1911 provide for at least one annual inspection of every factory and also deal with cleanliness, overcrowding, ventilation, water supply, etc. Under these rules, Inspectors must satisfy themselves that the health and safety of the employees have been duly guarded and that all children employed have been certified as to physical fitness.

Bengal.—In this Presidency public health legislation is reported to have made notable advances since 1922. In respect of *rural areas*, the passing of the Village Self-Government and the Food Adulteration Acts in 1919 ushered in a new era in provincial public health legislation in respect of local sanitation and the control of food and drink. The former Act provides for registration of births and deaths in union boards ; for sanitation, conservancy, public nuisances, water supply, drainage and prohibition of certain dangerous trades without license, etc. In the Food Adulteration Act, 1919, the provisions dealing with food supplies differ from those in the Bengal Municipal Act, the Local Self-Government Act and the Indian Penal Code, in that in the former it is a punishable offence merely to mix a food article with any extraneous substance, irrespective of the substance being injurious or not to human health, whereas in the latter injury to human health must be proved before conviction. Under the provisions of this Act public analysts have been appointed in Government and in certain district laboratories. The Agriculture and Sanitary Improvement Act, 1920, provides for the drainage of marshy lands in order to make these fit for agricultural purposes and to improve local sanitary conditions by regulating floodwaters and water-courses. The provisions of this Act will be further supplemented by those contained in a Rural Development Bill, now under consideration, which aims at improving the public health through a better system of irrigation and drainage.

In respect of *urban areas*, legislative measures include the Food Adulteration Act, 1919, and the Bengal Municipal Act, 1932. The latter Act includes sections dealing with nuisances of all descriptions, residential sanitation, breeding of mosquitoes, insanitary tanks, pools, offensive trades, unsatisfactory water supplies, burning *ghats* and burial grounds, water supply and sewerage systems, construction of buildings and *bustles* on sanitary lines, insanitary and dangerous property, control of infectious diseases, sanitary and hygienic principles for hospitals and dispensaries, child welfare and school hygiene, markets and slaughter houses, etc. Other provincial legislation enacted during

the period includes (*i*) the Calcutta Municipal Act, 1923, which provides for a public health organisation under a health officer and deals with problems of sanitation and hygiene connected with the city extension, with overcrowding, and with mills and factories ; and (*ii*) the Suppression of Immoral Traffic Act, 1923.

In regard to the improvement of labour conditions, the Factories Act, 1934, with rules framed thereunder, and the Workmen's Compensation Act, 1923, have been enforced.

C. P. and Berar.—The following Acts have been introduced since 1919 :— (1) The Village Sanitation and Public Management Act, relating to sanitation and improved conservancy and water supply arrangements, the constitution and maintenance of roads, etc., (2) the Village Panchayat (Amendment) Act of 1928, delegating to panchayats the control and administration of conservancy and water supply, etc., (3) the Prevention of Adulteration Act, 1919, and (4) the Juvenile Smoking Act of 1929. The Vaccination Act, 1880, was amended in 1932 in order to empower local bodies to extend the Act to the whole or any part of a local area or to specified villages, and to frame rules for the proper enforcement of the Act.

Bombay Presidency.—Before the year 1919 the District Municipal Act was applicable to all municipalities except Bombay city, but in 1925 the Bombay City Municipalities or Boroughs Act was passed and was extended to the whole of the Presidency. Section 61 of the latter gives a municipality powers in respect of control of markets and slaughter houses, lodging houses, inspection of milch cattle, cattle sheds, registration, epidemics, water supply, sanitation, conservancy, drainage, etc. Section 34A of the same Act, as amended in 1930 (Bombay Act III of 1930) provides for the dismissal of a health officer by the local Government on the recommendation of a municipality, supported by a resolution passed by the majority of councillors. The public health administration in Bombay and Karachi cities is carried out under special Acts, *viz.*, the City of Bombay Municipal Act, 1888, and the City of Karachi Municipal Act, 1933. Under section 62 of the District Local Boards Act, passed in 1923, the district local boards have power to frame byelaws, with the sanction of the local Government, in regard to the control, etc., of markets, dairies, creameries, granaries, grain shops, slaughter houses, etc. The Village Panchayat Act was passed in 1933. Section 26 of this Act deals with water supply, drainage, conservancy, fairs, sanitation, etc. The Bombay Prevention of Adulteration Act was passed in 1925. The Village Sanitation Act, 1889, was amended in 1931 to provide for the constitution of sanitary committees and sanitary boards empowered to supervise sanitation in villages.

Under the Epidemic Diseases Act, 1897, rules for the control of cerebrospinal fever, temporary plague rules for the Presidency proper and temporary cholera rules for Sind have been promulgated. The question of a new Public Health Act is under consideration.

Madras Presidency.—In 1920 the Madras Town Planning Act was passed with the object of controlling towns development and of ensuring their sanitary conditions and amenities. Rules under the Act were framed in 1933. Other important legislative enactments of the same year were the Local Boards Act (XIV of 1920) and the District Municipalities Act (V of 1920). A special feature of the former related to the transfer to district boards of control of scavenging and other sanitary arrangements at fairs and festivals and the levy of contributions from persons having control over places of pilgrimage for maintaining such arrangements. This Act further introduced district health orga-

nisations ; the services of health officers appointed in this connection were provincialised only in 1934. The abolition of *taluk* boards in 1934 has meant the transfer of public health staffs to district board control ; this arrangement facilitates transfer and co-ordination of these staffs. Section 194 of the Act, as amended in 1930, requires the district health officers to be consulted before permission is given for the construction of factories. The District Municipalities Act provides *inter alia* for the recovery of contributions from temple authorities towards sanitary arrangements made during fairs and festivals and for the appointment of Commissioners as municipal executive officers with a view to facilitate public health administration. Additions to the Act include the appointment of municipal health officers and their provincialisation ; the grant of powers to health officers to enter into places where dangerous disease is suspected to exist and to carry out disinfection ; and the grant of powers to municipal councils in regard to the closure of places of public entertainments during epidemics. In 1926, the Nurses and Midwives Act and the Hindu Religious Endowment Board Act were enforced. Under the former, no unregistered midwife can be employed by a local body either in a hospital or a child welfare centre without the special sanction of Government. The latter has empowered trustees to levy a tax from pilgrims or worshippers to meet the cost of sanitary arrangements. The Suppression of Immoral Traffic Act, 1930, aims at the suppression of brothels and traffic in women and children. Rules have been framed in 1933 under the Public Resorts Act, 1888, and under the Madras Town Planning Act, 1920 ; and in 1932 and 1934 under the Prevention of Adulteration Act, 1918. Rules under the Indian Factories Act, as amended in 1934, are in course of preparation ; the amended Act prescribes standards for adequate lighting in factories ; provides for washing facilities to factory operatives dealing with injurious or obnoxious substances ; and requires the provision of rest shelters for workers and crêches for children.

In addition, important amendments have been made to regulations issued under the Epidemic Diseases Act, these conferring more extensive powers on collectors and officers of the Public Health Department. For example, Collectors can now issue orders for evacuation more promptly ; they can deal with sun disinfection of grain, and of other articles of merchandise liable to be infected with plague fleas ; and they can prohibit trade with infected localities. The plague or public health officers are authorised not only to inspect any premises but also to enforce preventive measures.

As the ordinary provisions of law under the District Municipalities Act and Local Boards Act were considered insufficient for the effective prevention of cholera at the major festivals in this Presidency, Government have provided special regulations under the Epidemic Diseases Act conferring wide powers on the officers of the Public Health Department, not below the rank of a sanitary inspector, in regard to control of infectious diseases, water supply, food supplies, disposal of the dead, occupation of premises or land, without recourse to the Land Acquisition Act, and control of the beggar nuisance.

Assam.—This province has applied to towns, tea-gardens and municipalities certain Bengal Acts, such as the Bengal Births and Deaths Registration Act (Act IV of 1875), modified up to March, 1932, and the Bengal Vaccination Act (V of 1880), modified up to July, 1929. These have not been extended to rural tracts. In the case of vaccination, the regulations framed under the Epidemic Diseases Act, III of 1897, are enforced in smallpox infected areas as necessity arises. Steps have now been taken to replace the first of these Acts by the Assam Births and Deaths Registration Act, 1934, whilst

the Bengal Municipal Consolidation Act, 1876, and the Bengal Municipal Act, 1884, have also ceased to operate, these having been superseded by the Assam Municipal Act, 1 of 1923. With a view to prevent adulteration of food, the Assam Pure Food Act (IV of 1932) was passed in 1932 and rules have been framed under section 26. Under the Assam Municipal Act, 1923, with later amendments, dangerous diseases can be made notifiable in municipal areas under the provisions of the Indian Epidemic Diseases Act. Special regulations have also been issued in 1924 and 1930 in addition to those under the Epidemic Diseases Act, 1897, to deal with outbreaks of plague, smallpox and kala-azar and the reporting of outbreaks of epidemic diseases. Under the Municipal Act, 1923, the local Government may require a municipal board (*i*) to appoint such health officers and sanitary inspectors as it may think fit or (*ii*) to employ such officers of Government as health officers and sanitary inspectors as it may think necessary.

Provisions exist in the Assam L. S. G. Act, 1919, and the Assam Municipal Act, 1923, as amended to date, in regard to water supplies, scavenging and cleansing, slaughter houses, burning *ghats* and burial grounds, cow sheds, the removal of nuisances, etc. With regard to health conditions in factories, the provisions of the Assam Municipal Act and the Indian Factories Act, 1911, are applicable, whilst the Tea District Emigrant Labour Act of 1932 deals with sanitary arrangements for labourers *en route* to tea-gardens.

Burma.—The most notable legislative events were (*i*) the Rural Self Government Act, 1921, which devolved on district councils responsibility for the improvement of sanitation, prevention of infectious disease, regulation of slaughter of cattle, markets, etc., which required district councils to employ as district health officers those officers selected by Government in their behalf; and which empowered the local Government to extend the Vaccination Act, 1880 and the amendment of 1909 to rural areas; (*ii*) the Midwives and Nurses Act, 1922, amended in 1927, regulating the registration of midwives and nurses, (*iii*) the Foods and Drugs Act, 1928, providing for the sale of articles of food and drugs in a pure state; (*iv*) the Underground Water Act, 1930, intended to conserve and protect underground sources of water supply; and (*v*) the City of Rangoon Municipal Act, 1922, which superseded the Burma Municipal Act, so far as Rangoon was concerned and established the Rangoon Municipal Corporation. The one serious drawback in this Act is that the D. P. H. has no powers of inspection except when required to do so. The Burma Vaccination Law (Amendment) Act, 1909, was further amended to empower the P. H. O., Rangoon, to vaccinate *all* unprotected persons arriving by sea and not only labourers as was the case previously. It also empowered municipal and town committees to frame rules for re-vaccination of persons aged 12 years. It empowered Government to insist on the appointment of a municipal health officer; and when necessary, to frame rules regarding the qualifications, pay, manner of appointment, etc., of these officers and their assistants and of public health inspectors, etc. It is obligatory on each committee to employ one or more public health inspectors. Powers have been vested in the committees in respect of the control of mosquito-breeding and the reclamation of low-lying lands. Provisions dealing with the control of epidemic diseases have also been considerably augmented.

In order to remedy the inadequacy of provisions in the Burma Municipal Act, rules were framed in 1925 in regard to the prevention of plague, cholera and smallpox; those for cholera and smallpox for many years remained in force only in towns and municipalities, excluding Rangoon, but in 1934, the

rules for all three diseases were made applicable to the whole province. In 1931 the regulations under the Municipal Act in respect of public health matters were revised so as to prohibit even the temporary appointment of unqualified persons as health officers, public health inspectors or vaccinators ; to enable health officers to be co-opted as members of municipal committees and to regulate the removal of rubbish and excreta under departmental or contract arrangements. Section 9 of the Leper Act, 1898, forbidding lepers to conduct trades, to ride in public conveyances or to bathe in public wells and tanks, which originally applied to 9 municipalities, was made applicable to the whole province.

Probable trend of Population Growth in India.

210. In the opening pages of this report, attention has again been invited to the progressively large annual additions to the population of this country. The problem of numbers in relation to food supplies and employment has recently received considerable attention both in the public press and in the Legislative Assembly and is of such importance to the public health that it may not be out of place to give a brief resumé of a recent paper on " Probable trend of Population Growth in India " published by Dr. K. C. K. E. Raja, D. P. H., etc., Assistant Professor of Vital Statistics and Epidemiology in the All-India Institute of Hygiene and Public Health, Calcutta. In this arresting paper the author takes as his text a statement made by Dr. Enid Charles, in a recently published volume entitled " The Twilight of Parenthood ", to the effect that " the population of China is believed to have been practically stationary for a long time. *That of India is probably slowly increasing.*" The last sentence is so contrary to considered opinion in India that it immediately invited challenge and Dr. Raja, at my instigation, made a detailed examination of all available data in order to determine, if possible, the actual position in this country and to demonstrate the probable future trend of growth.

Unfortunately the vital statistics of India are not sufficiently complete or detailed to permit of the use of the two valuable statistical indices applicable to western countries, but Dr. Raja has collected such evidence as exists and has very ingeniously utilised every available figure in his attempt to throw light on a difficult problem. His first table sets out the percentage increase of population in India for successive censuses from 1881 to 1931. Necessary corrections having been made for the inclusion of additional territories and for progressive improvements of methods of calculation ; the percentages given in the table are strictly comparable.

TABLE XII (*i*).

Percentage increase of population in India.

Period.	Percentage of increase*.
1881-1891	9·6
1891-1901	1·4
1901-1911	6·4
1911-1921	1·2
1921-1931	10·6

" The largest growth took place between 1921 and 1931. In the period 1891-1901 and 1911-1921 the rates of growth were very small. During the former, a severe famine affecting large tracts of India occurred between 1899

*Quoted from the Actuarial Report incorporated in Census of India, 1931, Vol. I, Part I.

and 1901 and must have been a contributory factor as was the outbreak of plague in the latter half of the decennium. As regards 1911-1921, the low rate of increase is to be attributed to the pandemic of influenza which probably destroyed about 14 million persons in 1918 and 1919." The Census Commissioner in his 1931 report has expressed the opinion that the normal percentage increase in India may be taken as about 10 per cent. but, it may be added, this rate has been exceeded in each of the last three years.

The figures given in Table XII(*ii*) compare the recent rate of growth in India with that of a number of other countries and as these have been compiled from the Statistical Review of the Registrar-General of England and Wales for 1932 they may be taken as accurate.

TABLE XII (*ii*).

Comparison of the rate of growth of population in India with other countries.

	Decennial rate of increase or decrease per cent.
Union of Soviet Republics (Russia)	+38·6
Australia	+21·9
Canada	+18·1
The United States of America	+16·1
Egypt	+11·5
India	+10·6
Spain (including Canary Islands)	+10·6
Japan	+10·0
Belgium	+8·4
Italy	+ 6·3
Norway	+ 6·2
England and Wales	+ 5·5
Germany	+ 4·4
Sweden	+ 4·0
Denmark	+ 3·4
France	+ 2·7
Scotland	— 0·8
Austria	— 1·7

When one remembers that according to the last census, India had an adverse balance between emigration and immigration of about $1\frac{3}{4}$ millions, this table demonstrates that, compared with other countries, India has exhibited a high rate of increase. In fact, it may fairly be said that India has one of the highest rates of natural increase in the world. The Soviet Republic is an exception and in the cases of the United States of America, Australia and Canada, the recorded increases must have been largely due to immigration, so that Egypt alone shows a higher natural increase than India.

"But, as Dr. Enid Charles has pointed out, the population question has to be discussed not only from the standpoint of the actual rate of increase of the present time but from that of the probable trend of its growth, as judged by the age composition of the female population at the reproductive ages,

the specific fertility at these ages and the rate of survival of the girls born." The next part of Dr. Raja's paper discusses these points. Table XII (*iii*), taken from this report, shows the birth rates, death rates and annual increases of population from 1901-1933. These figures indicate clearly that since the beginning of the present century annual additions to the population have steadily increased mainly because the high birth rate has remained more or less stationary whilst the general mortality rate has progressively diminished.

TABLE XII (*iii*).

Growth of population in India.

Years.	Birth rate per mille.	Death rate per mille.	Annual excess of births over deaths.
1901-1910	38	34	933,623
1911-1920	37	34	667,654
1921-1930	35	26	1,995,301
1926	35	27	1,935,069
1927	35	25	2,506,977
1928	37	26	2,702,459
1929	36	26	2,297,950
1930	36	27	2,207,265
1931	35	25	2,520,791
1932	34	22	3,248,840
1933	36	22	3,582,089

But the age composition of the female population must always be an important determining factor in regard to population growth. From Table XII (*iv*), which gives Indian figures for the child-bearing age periods at the past 5 censuses, it is obvious that the 1931 census figures are the most favourable for enhanced growth.

TABLE XII (*iv*).

Proportion of women at each age-group per 10,000 females for successive censuses.

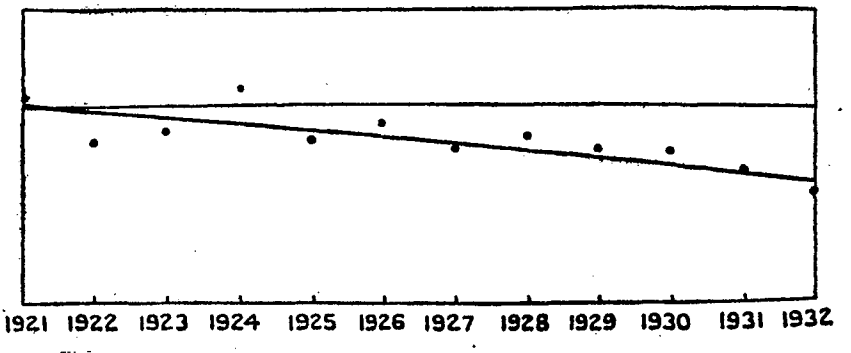
Ages.	1931.	1921.	1911.	1901.
All ages	10,000	10,000	10,000	10,000
15—19	938	815	826	835
20—24	985	881	930	892
25—29	868	886	909	895
30—34	756	833	835	851
35—39	595	565	556	557
40—44	505	621	631	652
45—49	389	348	338	339

The percentages of married women at these age periods are, however, still more important and the relevant figures set out in Table XII(*v*) show that the numbers of women in the various reproductive age groups were more favourable to growth of population in 1931 than at any of the previous census periods. This is evident because fertility rates of the earlier age groups are always definitely higher than those of the later age groups.

№ 8

MORTALITY RATE FOR FEMALES (10-14), INDIA

EQUATION Y = 8·4032 − 0·3231 X



MORTALITY RATE FOR FEMALES (5-9), INDIA

EQUATION Y = 10·3726 − 0·2285 X

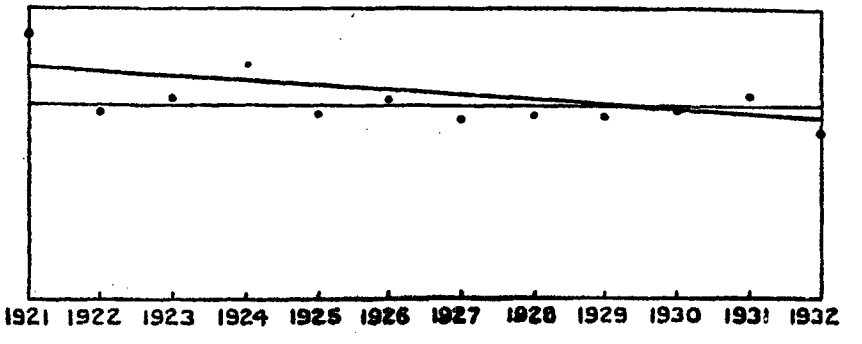


TABLE XII (*v*).

Proportion of married women at different age periods per thousand women at the same ages.

Ages.	1931.	1921.		1911.	1901.
15—20	818	771			777
20—25	886	877			876
25—30	869	863	15—40	833	859
30—35	824	797			793
35—40	703	727			722
40—45	627	599	40 & over	401	584
45—50	473	527			

A further statement giving expected numbers of births for the age distributions shown in these two tables confirms the deduction that the 1931 census female population is more favourably constituted for growth than those of the previous censuses.

In the next section of the paper, the Ukraine rates quoted by Dr. Charles are applied to the graduated population for each reproductive year of female life from 15—49 and, on this basis and by means of well-recognised statistical methods, the birth rate in India per 1,000 females of reproductive age is estimated to be 161·5 as compared with 155·6 in the Ukraine. It is obvious, however, that "the low rates of 0·2 and 1·6 *per mille* for ages 15 and 16 in the Ukraine must be due to the very small percentage of married women at these ages." In India, on the other hand, a large number of marriages take place at these and the immediately succeeding years and the proportion of married women in the age groups 15—34 inclusive is shown to be no less than 80—85 per cent. of the total. Under these circumstances, there can be little doubt that if fertility rates by ages were available in India, the difference between Ukraine and India would have been much greater.

In dealing with population growth, it is necessary to consider not only the rate of production but also the chance of survival of girls born today. Rates of mortality in India are admittedly higher than those in most other countries so that the higher rates of fertility would to some extent be counterbalanced by the lesser chance of survival through the reproductive age period. By comparing India's experience in regard to survival from census to census since 1901 and by using the life-table figures given in the 1901, 1911 and 1931 census reports, it has been found that the average number of years lived by a woman in the reproductive period is 12·26 in 1901, 12·05 in 1911 and 13·91 in 1931. The 1931 life-table, therefore, gives to each female child a survival age about 1·86 years more than in 1911 and 1·65 years more than in 1901. It may be held that these comparative figures favour an increased expectation of production at the present time.

Recent mortality experience for the age groups 5—9 and 10—14 years also gives valuable information and the figures from 1921 to 1932 are given in Table XII (*vi*) and are plotted on chart No. 8, facing page 286.

TABLE XII (*vi*).

Specific mortality rates of India (females) by ages for the period 1921—32.

Age groups.	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930	1931	1932
10—14	10·3	8·0	8·8	11·0	8·3	9·0	7·9	8·2	7·8	7·5	6·6	5·5
5—9	13·8	9·6	10·3	12·1	9·6	10·2	9·3	9·6	9·6	10·0	10·5	8·9

It will be seen that the death rates of the age group 10—14 show a more definite decline within recent years than the group 5—9, but the downward trend is distinct in both instances.

From the evidential data analysed in this paper, it seems clear that, utilising the Ukraine rates of fertility, the age distribution of the reproductive female population in India is more favourable than that of the Ukraine which has a gross reproduction rate of 2·49. Comparison of the relevant Indian figures also suggests that the rate of growth is likely to be higher in the present decade than that recorded in previous years. The figures relating to the age group 10—14 point to the same conclusion whilst the large rate of natural increase which occurred between 1921 and 1931 appears unlikely to undergo any great reduction in the immediate future. It seems unnecessary to repeat that external migration cannot materially contribute to reduction of numbers especially when it is remembered that during the past four years the figures for emigration have been almost reduced to vanishing point.

All these considerations have rightly led the author to conclude that, unless there be epidemics or disasters of the dimensions of the influenza pandemic of 1918-19, Dr. Enid Charles' statement that the population of India is "probably slowly increasing" is a serious underestimate of the present trend of events. So far as India is concerned society has *not* "lost the power to reproduce itself", nor is there any fear that it "must continue to dwindle unless a fundamental readjustment occurs within the human ecological unit". On the contrary, every scrap of evidence points unequivocally to the conclusion that the population of India is increasing at an alarmingly rapid rate. In last year's report the forecast was made that by 1941, when the next census is taken, the population of India would probably reach the figure of 400 millions. Present indications seem to suggest that that estimate was unduly conservative.

Birth Control.

211. The subject of birth control has received so much discussion and publicity in India during recent years that it may perhaps be considered justifiable to refer to the question in this concluding section of my report. In a recently published article entitled "Some Aspects of Birth Control in India," Dr. Ruth Young, Director of the Maternity and Child Welfare Bureau, has discussed the question in a manner which should provide cause for thought to those interested. I have taken the liberty of incorporating some of her main lines of argument in this paragraph as these seem to be particularly *apropos* at the present time. Lord Horder in his presidential address to the recent Conference on Birth Control in Asia said that "the subject of birth control had got beyond the stage of controversy" and, if one may judge from the activities —written and vocal—of its protagonists in India, it would seem as if the statement were equally true for this country. Indeed sometimes

"it would almost seem as if the birth control movement were capable of solving all India's problems. It is to reduce the birth rate and the death rate, it is to cure poverty, relieve pressure on the land, reduce over population and prove 'the master-key to social and economic swaraj' and even political swaraj. From the platforms of women's meetings we hear similar statements when it is declared, with more justification, that birth control will release women from drudgery, produce healthy children, promote married happiness and leave women free to serve their country."

"All this enthusiasm has its good side, but it is not sufficiently based on real understanding of what birth control can achieve and it is certainly not accompanied by an appreciation of the difficulties involved."

" The objects of birth control are roughly two and which of these two seems the more important depends on the point of view of the individual interested in the subject. Birth control as a means of population control is what appeals to some people, birth control as a personal matter, to others. In the former case those who wish to see birth control popularised in India argue that India cannot support its present population, much less a population which is increasing at the rate which India has shown during the last few decades. It is also claimed that bringing down the birth rate will lower the death rate. Both these statements are highly controversial and have not been proved one way or another, perhaps are not susceptible of proof at present. At any rate they need much more thought and study than are given to them by those who rush into print or speak glibly from platforms. They are bound up with economic, social and even biological problems as well as political ones which are at present far from solution. Whatever our opinions on the population questions are, therefore, it behoves us to be cautious in making any sweeping statements. For various reasons, some of which appear below, birth control as an effective method of population reduction is not likely to be operative for many years to come. Are other means of ameliorating the poverty and economic degradation of India to be left in abeyance in the meantime ? The answer will be a vociferous No, but in actual fact it often seems as if it were so ".

" Those who advocate birth control as a personal matter are on safer grounds. Man has acquired control over his environment and he has the power also of limiting the number of his offspring. That he may do so for purely selfish reasons is a fact which has to be accepted and cannot be argued about. This state of affairs only applies to a minute fraction of the population of India at present though doubtless the numbers deliberately limiting their families below the number needed to keep a stable population will increase. What we are faced with in India now is a great number of women who are suffering, and often dying, from too many and too rapid pregnancies. The reaction on the children of such marriages is obvious, they swell the infant mortality rate and are a potent cause of the low expectation of life of the average inhabitant of India. No one who faces up to the amount of suffering involved, but will advocate birth control as a means of ending it. Women should have the right of deciding the number of children they wish to have and the spacing of these children ".

It is this latter point of view only upon which I propose to comment, for no one can assert that the picture drawn in the last paragraph is overdrawn or is an exaggerated description of actual facts. If, therefore, birth control methods can reduce the terrible infantile mortality of this country and if they can restrict even to a small extent the amount of suffering, illness and death among the women, obviously their adoption need not be considered otherwise than as humane and beneficial public health measures. The subject for some has moral and religious aspects which make even its discussion repugnant, but these aspects are not the immediate concern of public health officers and need not perhaps be considered in dealing with the health problem under discussion. In Sir George Newman's report for 1933 on " The State of the Public Health " in England and Wales the subject of birth control receives mention and it may be of advantage to those interested in the subject to quote some of his remarks :—

" It must not be assumed that ' birth control ' is a novel idea. Intentional and purposive contraception has existed from the earliest times in human history. Recently, however, its practice has become more conscious and concrete, more talked about, and more artificial in method. This change is not necessarily evil, nor does it necessarily raise new moral issues. It is the means which have changed, and which are advertised and publicly discussed. The fact that the means have brought to a large number of persons definite relief from immediate and practical difficulties and burdens, financial as well as physical, must not be overlooked. The rightness or wrongness of the use of those means, the expediency or inexpediency of their application, should always be estimated without prejudice and on the plane of their motive and occasion. The means to be adopted and their usage is, however, another question, and the advocacy of indiscriminate and unskilled artificial contraception has some substantial disadvantages which should be recognised :—

(*a*) organised popular instruction in this subject is liable to become propagandist and pseudo-authoritative in presentation and impression ; it leads also to

commercial exploitation of the means, which may be both unsafeguarded as to expediency and exorbitant as to price, thus imposing risk or hardship upon the purchaser;

(*b*) the effect of the practice of unsafeguarded artificial contraception may be not only local and physical, but general, psychological, and even anti-social;

(*c*) the means may be deleterious in their social or physical results, and are in any case uncertain in action. Experience indicates that in a substantial percentage of cases artificial contraceptive methods if unskilled in application may fail to prevent conception;

(*d*) there is no absolute guarantee of value—physical, social, moral or humane; such methods can be used wisely and beneficially, but they can also be used for selfishness, debasement and the encouragement of undesirable habits; the variableness and morality of the value is dependent upon human character and on many circumstances and conditions;

(*e*) artificial contraception cannot in any case be a substitute for social amelioration, self-control, restraint, mutual consideration, or decent and worthy conditions of life.

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On general grounds it is clear that organised instruction in contraceptive methods is alien to the purpose of a maternity and child welfare centre established by a Local Authority for nursing and expectant mothers, would militate against the objects of its establishment and might well be distasteful to its clients. Such centres are maintained out of rates and taxes paid by all sections of the community, and therefore they should not be used for any purpose to which certain sections of the community might reasonably object. Moreover, the staffing and furnishing of these centres is not such as provides equipment or makes the necessary provision for the systematic teaching, demonstration and supervision of artificial contraceptive methods, still less for the regular practice of such methods or the consequent following-up of any untoward results.

These are some of the reasons which have led the Ministry of Health to discourage any close association between organised artificial contraception and the maternity and ante-natal centres established under the Maternity and Child Welfare Act of 1918.

The attitude of the British Ministry of Health is made perfectly clear in its last Circular on the subject issued in May 1934.

The Departmental Committee on Maternal Mortality and Morbidity, in their Final Report published in 1932, called special attention to the importance of the avoidance of pregnancy by women suffering from organic disease such as tuberculosis, heart disease, diabetes, chronic nephritis, etc., in which childbearing is likely seriously to endanger life. The Committee considered that advice and instruction in contraceptive methods should be readily available for such women.

It was pointed out in the Memorandum and Circular of 1931 that the powers which the Public Health Acts confer upon Local Authorities for the provision of clinics limit their availability to sick persons, but the Minister is advised that there is nothing to prevent the Local Authority from rendering such a clinic available for women suffering from forms of sickness other than gynæcological conditions. After careful consideration of the recommendation made by the Departmental Committee, the Minister is of opinion that where a Local Authority has provided a clinic at which medical advice and treatment are available for married women suffering from gynæcological conditions, and at which contraceptive advice is afforded to married women so suffering in whose cases pregnancy would be detrimental to health, it would be proper also for married women who are suffering from other forms of sickness, physical or mental, such as those mentioned in the Report of the Departmental Committee, which are detrimental to them as mothers, to be afforded contraceptive advice at the clinic if it is found medically that pregnancy would be detrimental to health. What is, or is not medically detrimental to health must be decided by the professional judgment of the registered medical practitioner in charge of the clinic.

Of those who are able to give the subject calm consideration, few will find reason to cavil at the conclusions reached by the Ministry of Health and

these paragraphs have been quoted in the hope that they will assist thoughtful men and women in this country to make up their own minds on a question which has unfortunately already become a matter of heated controversy. What ought to be remembered first and last is that by practising certain methods included under the title 'birth control' it is possible not only to save the lives of many infants now doomed to an early death but to lessen a terrible amount of suffering, illness and death which are the lot of thousands of mothers of all ages in this country. If these aspects of the question were kept in mind, much of the controversy would quickly disappear and the real value of birth control as an important factor in preventive medicine would be recognised. But "suppose for the sake of argument that women in India were eager for advice and ready to act on it,—a large assumption,—where are they to get the advice? For advice of this nature the great majority of women will prefer to go to medical women." One has only to recall the fact that there are at the present moment only about 700 medical women practising in this country to realise the impossibility of any general adoption of birth control methods within a measurable space of time. "There is nothing more sobering than the application of arithmetic to such problems. It pricks many bubbles".

Cerebro-spinal Meningitis.

212. In a public health memorandum issued in 1932, the gradual spread of epidemic cerebro-spinal meningitis to the East was discussed and all available information as to the incidence of the disease in India was given in a series of tables. The 1932 figures showed that although cerebro-spinal meningitis had occurred in sporadic fashion in a number of towns and districts, there was little evidence that it existed anywhere in endemic form.

An examination of available records, however, indicates that cerebro-spinal meningitis has certainly been known in India for over half a century. The jails and army statistical reports since 1881 show that the disease has appeared here and there at longer and shorter intervals and no doubt the civil population has had the same experience. For instance, in the Punjab, during 1920, 13 cases were treated in Lahore. By the courtesy of the Army Medical Directorate, I am able to give the annual figures for all British troops and their families and for all Indian troops since 1921. These statistics corroborate what has been said as to the incidence of cerebro-spinal meningitis; the increase during the last three years is striking.

TABLE XII (*vii*).

Cerebro-spinal fever (cases).

Year.	Jan.	Feb.	Mar.	Apl.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.	Total
1921	1	1	...	...	1	...	...	...	...	...	...	1	4
1922	...	...	1	1	...	2	...	1	...	...	...	1	6
1923	1	1	1	5	3	1	...	...	...	...	...	...	11
1924	Figures for individual months not available.												1 3
1925	...	...	...	...	...	...	...	...	...	...	...	1	1
1926	1	...	...	...	1	...	...	1	...	...	...	...	3
1927	...	...	2	...	...	...	1	1	...	...	...	...	4
1928	1	1	2	2	...	1	...	1	...	...	...	2	10
1929	3	...	2	1	1	2	...	1	1	...	...	...	11
1930	2	2	1	...	2	...	...	...	...	...	1	5	13
1931	3	3	1	3	1	...	...	...	...	1	2	1	15
1932	3	3	1	2	2	1	1	...	...	1	...	3	17
1933	6	6	5	1	1	1	1	...	1	3	3	...	28

Epidemiology.—The most notable epidemics in recent times have been that of 1931 in the Shikarpur special jail in Sind (Bombay Presidency) ; that of 1932-33 in the Lahore Borstal Institution, Punjab ; the 1933-34 epidemic in Ahmedabad town in Bombay Presidency ; and that of 1933-34 in Delhi city. In the first of these, the infection appears to have been introduced from Upper Sind, a so-called endemic area. Despite precautions, sporadic cases occurred between April and December, 1931, and the mortality was high, as 12 of the 13 recorded cases died. During 1932, 7 further cases with 4 deaths occurred, these being evidence of the difficulty of freeing an institution of infection once it is introduced.

With regard to the outbreak in the Lahore Borstal Institution, during 1932, 27 cases with 11 deaths were recorded. The first cases occurred among prisoners working in the kitchens and thereafter cases were reported from different circles and barracks. Nasopharyngical swabs of 1,268 inmates were examined and about 20% showed organisms morphologically indistinguishable from the meningococcus, whilst no less than 66 % of the kitchen workers were found to be carriers. By cultural examination carried out at a later period, a carrier rate of over 12 % was found in the original population, whilst of 1,387 new admissions only 9 or 0·65 % were found to be carriers. It is to be noted that at the time of the epidemic this institution was seriously over-crowded and this factor probably had much to do with the outbreak and its continuance.

Other outbreaks occurred during 1932, but except for that in Calcutta, no accurate figures can be quoted. In Nagpur, in the Central Provinces, for instance, 5 cases with 3 deaths were recorded. In Burma, a total of 14 deaths were registered in seven different urban areas, so that in this province infection seems to have been fairly widespread. In Calcutta, the cases numbered 145 and deaths 143. It is probable that in this city many cases remained undetected, as a cent. per cent. mortality rate is unusual, but there is little doubt that Calcutta was the centre of a serious outbreak.

During 1933, 142 cases with 68 deaths were recorded in Delhi city. Several of these cases were imported from outlying districts from which it is clear that by this time infection was widespread in rural areas. In the neighbouring city of New Delhi, also, 12 cases with 6 deaths were recorded, whilst in the Delhi jail 4 cases and 3 deaths occurred in 4 different gangs of prisoners.

Another sharp outbreak occurred in the Motihari jail in Bihar and Orissa during April 1933. Within three weeks, 11 cases with 6 deaths were recorded but after further 4 cases in May the infection disappeared.

During the whole of 1933, the disease continued in the city of Calcutta and no fewer than 387 cases and 348 deaths were recorded. Isolated cases were also reported from a few other places such as Chittagong and Baranagar towns. In the Punjab, whilst no further outbreak occurred in the Borstal Institution, a number of sporadic cases were recorded in Lahore city.

Reports were also received from Bombay Presidency (30 cases with 27 deaths), from the Central Provinces, from N.-W. F. Province, from Rajputana and Central India States and from Burma including the Southern Shan States. The disease therefore had spread widely during 1933 as compared with previous years although probably a sharper lookout for cases partly explains the increased incidence.

During 1932 and 1933 the Calcutta figures were as follows :—

TABLE XII (*viii*).

	1932.		1933.	
	C.	D.	C.	D.
January	..	..	13	13
February	7	7	35	35
March	16	16	63	63
April	8	6	28	25
May	10	10	40	36
June	13	13	23	16
July	14	14	29	29
August	19	19	44	44
September	7	7	24	19
October	18	18	26	22
November	11	11	32	21
December	22	22	30	25
Total	145	143	387	348

Other provinces and States have had outbreaks for which information is still lacking. But the most notable epidemic which has so far occurred was that in Ahmedabad city in Bombay Presidency. It reached its maximum in the early months of 1934, the first five cases occurring during early December 1933.

In India, as in other countries, cerebro-spinal meningitis appears at first in spasmodic fashion, cases occurring here and there with no apparent connection between one and the next. It follows that at this stage only rarely does more than one case occur in a given household and that course of events has been especially noted during the outbreaks in Delhi city. Only at a later stage, when epidemic conditions prevail, does one come across groups of cases which seem to be due to direct infection.

Periodicity.—As regards periodicity, generally speaking the incidence gradually increases to its peak at the beginning of the hot weather, *i.e.*, in the months of March, April and May. This fact is illustrated by the following Table which shows the monthly incidence of the Delhi outbreaks in 1933.

TABLE XII (*ix*).

	Cases.	Deaths.
January	1	..
February	5	2
March	18	3
April	20	7
May	34	21
June	13	5
July	5	2
August	7	7
September	..	..
October	3	3
November	10	9
December	9	9

There seems therefore to be a tendency for epidemics to die out with increasing day temperatures. The fact that the people tend to sleep out of doors as soon as hot weather temperatures prevail may have some influence in producing the decreased incidence.

Age incidence.—Cerebro-spinal meningitis usually takes its heaviest toll among children and young adolescents. The Delhi figures for 1933 given in the following table clearly indicate this variation

TABLE XII (*x*).

Age-groups.	Cases.
Under 1 year	..
1—5 years	8
5—10 „	16
11—15 „	19
16—20 „	36
21—30 „	34
31—40 „	7
41—50 „	4
51—60 „	1
61 and over	2
	127

Available information regarding the 1933 Calcutta epidemic leads one to the same conclusion. In Ahmedabad, too, although details are not yet available, young children suffered most but in the age group 20—30 years a high incidence was also recorded.

Sex Incidence.—Another interesting feature of the Delhi city epidemic is that of the total of 68 deaths recorded, 56 occurred among males and only 12 among females. Unfortunately it has not been possible to obtain comparative figures for sex incidence from other infected centres, but perhaps it may be deduced that the lesser incidence among females is partly due to the fact that the women folk owing to their secluded lives are normally less exposed to infection than are the males.

Researches.—Even modern medicine seems to be able to do little for the prevention and treatment of this serious disease. The Government of India Central Research Institute at Kasauli has prepared and issued an anti-meningococcic vaccine manufactured from cultures originally taken from cases in Delhi and this product is now under trial in selected communities, such as jails, schools and other institutions of the kind. Similar efforts have been made by the Director of the Haffkine Institute, Bombay, who has isolated strains of the meningococcus from cases at Ahmedabad. It is not so far possible to indicate the results obtained with these vaccines, and although the experts of the Ministry of Health in England are inclined to think that they may be of value, it is still premature to hazard any definite opinion.

In order to carry out tests to determine the types of meningococcus strains isolated from cases of the disease in India, Dr. Scott of the Ministry of Health has kindly supplied the Central Research Institute, Kasauli, with cultures of types I, II and III with their homologous sera. Sera of the four types have also been received from Oxford. The strains isolated from Delhi and other places have been typed at the Central Research Institute and so far most of those have been found to be type III (Group I), whilst they react with the

Oxford sera to full titre as though they were the same strains as the English ones. Sen and his co-workers in Calcutta (Jour. Ind. Med. Assoc., Vol. III, No. 7, March 1934) have published a preliminary report on the serological typing of the strains isolated during the Calcutta epidemic. Of 35 strains of meningococci typed by agglutination tests only in relation to the four types of Gordon and Murray, 18 were found to agglutinate strongly with type I serum and 17 with type III serum. Their results showed that the epidemic strains of Calcutta during the period from August to November, 1933, were mainly Type I, Type III or "Type I or III", whilst none belonged to Type II, Type IV or "Type II or IV". Further work in this connection is necessary, particularly before any attempt can be made to manufacture in India a high titre serum. Meantime serum prepared from the Indian strains isolated at Kasauli has been sent to the Ministry of Health for test.

Anti-meningococcic serum has not hitherto been manufactured in India, but English supplies have been imported and stocked for the needs of the Army and for civil purposes on emergency indents. The preparation of anti-meningococcic serum in India will depend largely on the results of the tests now under experiment, but it is proposed to make the attempt as soon as the 'type' question has been settled. This seems more than desirable because the results which have so far been obtained in India with English serum have not been entirely satisfactory.

Cancer in India.

213. Table XII (*xi*) gives the numbers of cases of new growths treated in hospitals and dispensaries in the different provinces.

TABLE XII (*xi*).

	Malignant		Non-malignant.	
	Cases.	Deaths.	Cases.	Deaths.
Total	**33,045**	**767**	**66,937**	**222**
N.-W. F. P.	406	15	1,037	1
Punjab	3,307	77	12,904	28
Delhi	583	16	780	7
U. P.	4,610	73	7,715	38
B. & O.	3,223	48	8,295	22
Bengal	3,412	159	7,250	23
C. P.	1,004	33	1,922	7
Bombay	2,920	130	3,321	26
Madras	11,719	135	19,603	62
Coorg	..	..	..	..
Assam	211	9	810	4
Burma	1,619	70	3,198	4
Baluchistan	31	2	102	..

The Radium Institute, Ranchi (B. & O.) treated 838 cases.

Deaths from this cause are not recorded except in the urban areas of Burma and in a few of the larger towns such as Bombay and Calcutta.

In towns in Burma the registered deaths totalled 162, including 53 in Rangoon. The details of the 53 deaths in Rangoon are given in Table XII (*xii*) together with the corresponding figures for the previous four years.

TABLE XII (*xii*).

	1933.		1932.		1931.		1930.		1929.	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
Burmese . .	6	12	5	20	5	13	5	13	7	11
Hindus . .	7	10	7	8	5	5	3	5	5	7
Muhammedans .	3	5	4	4	5	1	3	..	5	1
Chinese . .	4	1	3	4	2	..	2	1	1	..
Europeans . .	..	..	3	1	1	..	2	..	..	..
Anglo-Indians .	2	1	2	1	..	1	..	1	..	2
Other classes .	1	1	..	..	3	..	..	..	2	3

In Calcutta, 293 deaths were ascribed to cancer during 1932. In 225 cases, the alimentary canal was affected (137 males and 88 females); the genital organs in 53 female cases; and breast in 15 female cases. In Bombay city during 1933, 14 male and 7 female deaths occurred among cases in whom the buccal cavity and the pharynx were involved; other organs affected were digestive tract and peritoneum, 56 males and 19 females; the respiratory system, 14 males and 3 females; uterus and breast, each 17 female cases. Table XII (*xiii*) gives figures for the past 5 years.

TABLE XII (*xiii*).

	1933.		1932.		1931.		1930.		1929.	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
Buccal cavity and pharynx . .	14	7	9	1	14	4	7	1	10	2
Digestive tract and the peritoneum .	56	19	41	19	46	12	26	10	30	6
Respiratory system	14	3	9	1	9	..	15	1	5	2
Uterus . . .	..	17	..	8	..	12	..	7	..	9
Breast . . .	..	17	..	11	..	8	..	5	..	13
Total .	84	63	59	40	69	36	48	24	45	32

During 1932 and 1933 the I. R. F. A. has financed a small enquiry into the incidence of cancer in India under the direction of Dr. Vishwanath, Assistant Professor of Pathology, King Edward Medical College, Lahore. The figures which have already been quoted indicate the lack of reliable statistics in connection with malignant disease; the statistics given in hospital reports throughout India also throw very little light on the prevalence of cancer. Dr. Vishwanath has made a study of the records of hospitals and pathological laboratories in various provinces, particularly hospitals attached to medical schools and colleges, although it was recognised that this approach to the problem could be made only with caution. Records of biopsy and autopsy examinations in the pathology departments were studied, but out-patients records were not used. The in-patients records of surgical, medical and gynæcological units were examined mostly from the admission and discharge registers and

exceptional case histories were investigated where available. On the basis of figures for in-door patients in the hospitals of the U. P. from 1919 to 1932, the incidence of malignant disease works out at 1,039 per 100,000 in-patients.

For the individual teaching hospitals of the same province the incidence is :—

King George's Medical College Hospital . .	3,605 per 100,000
Medical School, Agra, Surgical and Gynaecological units	2,562 per 100,000
Lady Lyall Medical School, Agra . . .	909 per 100,000
For Bihar and Orissa, the provincial incidence amongst in-patients on the basis of records from 1920-32 is	1,106 per 100,000
Prince of Wales' Medical College Hospital . .	1,563 per 100,000
Darbhanga Medical School Hospital . . .	2,869 per 100,000
Cuttack Medical School Hospital . . .	2,046 per 100,000

If incidence were to be judged from autopsy records it would be very much higher. The study of a record of 754 post-mortem examinations made in the medical colleges of Lucknow and Patna showed 48 cases of malignant disease giving an incidence of 6,364 per 100,000.

From the material so far reviewed the following tentative conclusions have been reached :—

(1) Malignant disease is not uncommon in India. Autopsy records give an incidence of 1 in 18. Out of 273,902 hospital in-patients, whose records have been examined, 6,395 suffered from malignant disease,—an incidence of 1 : 42·8. Remembering that hospitals in India with in-patients accommodation are few and far between, that morbidity in the country as a whole is high and that only a small proportion of the sick attend the hospitals, it may not be unwarranted to estimate that the incidence of cancer in India stands at a figure not far removed from its incidence in the West.

(2) So far as the ratio of sarcoma to carcinoma is concerned, according to autopsy figures this is 1 : 2·65. The biopsy records place this figure at 1 : 2·1 ; the clinical records as a whole show it as 1 : 4·3. All these figures represent ratios which stand much higher than those obtaining in Western countries.

(3) The survey has shown that the highest incidence occurs during the age period 40 to 50 years, *i.e.*, 10 years earlier than in Japan or in most European countries and the U. S. A. In this connection the lower expectation of life in the Indian population as a whole has to be borne in mind.

(4) As far as the regional distribution of cancer is concerned, it seems that the preponderating incidence of carcinoma of one organ is balanced by a lesser incidence in other organs, and disparity between the incidence figures of different provinces appears to be subject to the same attempt at equilibrium. The higher percentage for female generative organs (54·2%) and the lower percentage for breast cancer (12·3%) in the Punjab has its opposite in the lower incidence in female generative organs (26·2 %) and the higher incidence in breast cancer (33 %) in Bihar and Orissa. There is a similar difference in the incidence of buccal cancer in these two provinces, the rates being 13·8% in Bihar and Orissa and 2·5% in the Punjab.

As regards the female generative organs, the Punjab showed the highest incidence, 19·1% from pathological records and 38·1% from clinical records. The age group 30 to 40 years is most heavily affected with this form of cancer. In the Hindu community cancer of the female generative organs seems to occur much more frequently than in other communities.

Cancer of the breast is next in order of frequency. Buccal cancer has its highest incidence in the province of Bihar and Orissa. The clinical records support the view that the incidence of this form of cancer increases with the degree to which the population is given to the chewing of *pan*. In the Punjab, where this habit is indulged in only to a small extent, buccal cancer occurs much less frequently.

In every province the incidence of buccal cancer is higher in the male sex and occurs much more frequently among Muslims than among Hindus. Skin cancer also occurs much more frequently in the male than in the female and among Muslims than among Hindus. In respect of cancer of the gastro-intestinal tract and of the liver, with the exception of the Punjab, the incidence is higher in the male than in the female sex and in Muslims the rate is higher than that among Hindus ; a possible explanation of this difference may be that in the Punjab the diet of the Hindus approximates to that of the Mohammedans in quality more than in any other province of India. It cannot be said whether a meat diet and the richer seasoning of food with chillies play any part in this higher incidence, but the increased frequency of gastric ulcer and carcinoma of the intestinal tract in Southern India where chillies form one of the staple articles of dietary is significant. Meat, however, is conspicuous by its absence from the diet of the majority of the inhabitants of Southern India and cannot be considered even as a possible carcinogenic agent.

Silicosis in India.

214. In continuation of the note on this subject in last year's report, there is now available a report prepared by the Miners' Phthisis Committee constituted to investigate and collect data in regard to the existence or otherwise of pneumonokoniosis, cyanide rash and mercury poisoning in the Kolar Gold Field, and to submit an opinion as to the desirability or otherwise of declaring all or any of the above mentioned diseases as "occupational diseases" under the Workmen's Compensation Regulation.

"The Committee undertook the study of Miners' Phthisis in the first instance, being the most important subject and collected interesting technical data, all of which were submitted through the courtesy of Messrs. John Taylor & Sons, London, to silicosis experts in South Africa for verification and obtaining an expression of their independent opinion. While awaiting the receipt of this report from that country the time extended for the submission of our report was almost drawing to a close. In consequence we submitted an *ad interim* preliminary report on 29th June, 1932, opining that the investigation conducted till then warranted us to conclude the existence of silicosis amongst some of the underground labourers and that further observation and close study was necessary to form a correct opinion regarding the exact proportion in which it exists, and the length of time it takes to develop. D. Stokes, a member of the Committee, reserved his opinion in this report pending the receipt of opinion of the experts from South Africa".

"This long expected report has since been received, Dr. L. G. Irwin, M.A., M.D., B.Sc., Pub.H., Chairman, Miners' Phthisis Medical Bureau, South Africa, the author states *inter alia* that the pathological and radiographic evidence appears to create a *prima facie* case, that instances of silicosis do occur amongst underground workers in the Kolar Gold Mines. He cautions that the present investigation must be regarded merely as a preliminary enquiry and that more extensive and systematic clinical, radiological and pathological investigations should be instituted before any legislative action is contemplated. It is needless to state that we are in full agreement with his views. Judging from

the low free silica content of the rock dust produced in Kolar Gold Field mines and from a critical study of the radiographs sent, he opines that it may take many years (probably twenty or thereabouts) of underground work to produce detectable cases of silicosis ".

" It is interesting to quote here from page 23, Report of the Chief Inspector of Mines in Mysore, his opinion regarding the prevalence of this disease here. *Inter alia* he writes :—

> " Owing to the low percentage of free silica present in the dust produced and breathed by the workmen it may take a very long time for the disease to assert itself in a recognisable form. The mines have been in operation for the last 50 years and more intensively during the last 30 years.
>
> I think, the time has arrived when one can expect to find a large number of phthisis cases amongst the long-standing underground workmen"

"The evidence of silicosis experts based on technical data supplied to them, the opinion of the Chief Inspector of Mines and Explosives based on close observation during the past 28 years of his intimate connection with the mining industry and our own investigation and close observation of cases of lung disability during the last 3 years, all clearly point to the conclusion that silicosis does exist on Kolar Gold Field, but its extent and the local conditions that go to modify its nature and incidence cannot, however, be appraised without a very special further investigation for which the service of a whole time medical officer of special attainments is necessary. The question therefore of including it as an occupational and therefore Compensatable disease cannot for obvious reasons be considered at this state of our investigation. In the absence of a regularly constituted agency, similar to the Miners' Phthisis Medical Bureau as in South Africa, it will not be possible to continue to study the incidence and spread of the disease amongst the workmen. If death occurs amongst them due to any lung disability the presence or absence of silicosis could only be proved by an autopsy, for which the sentiment of the workmen is generally opposed unless compelled by law. With a view to break this orthodoxy and secure as many bodies as possible for autopsy we would suggest the desirability of paying compensation to the lawful dependents of any deceased workman, if the autopsy proves that death was due to silicosis. This inducement, it is hoped, will encourage the dependents to freely and willingly offer bodies for autopsy, the result of which would greatly enhance our present knowledge.

" ....We have already indicated the absolute necessity for further systematic investigation for the inclusion or otherwise of silicosis as an occupational disease, ... ".

Yellow Fever.

215. For a number of years past, the public health authorities of this country have been concerned with the possibility of the introduction of yellow fever either by means of infected persons or infected insects. The fact that in large areas of India,—both coastal and inland,—the *Aedes egypti* is a common mosquito makes it of supreme importance that yellow fever infection should be excluded at all costs, for authoritative opinion is unanimous that the introduction of this disease would be the precursor of a terrible disaster resulting in millions of deaths. After the opening of the Panama Canal, it was considered that the danger was more likely to approach from the East, but during recent years this fear has been relagated to the back-ground and the opinion is now held that the chief risk emanates from the West by means of air traffic arriving at Karachi, the air port of entrance to all aircraft coming from Europe and Africa. In the opinion of the health authorities of this country that risk is by no means negligible in view of the ease with which infection can be carried by air and especially in view of the facts that cases of yellow fever have been recently detected in the Anglo-Egyptian Sudan and that the significance of the so-called " silent " areas has not yet been clearly determined. Imperial Airways Ltd. are at present working to a schedule under which aircraft travel from Kisumu on the borders of Lake Victoria Nyanza direct to Karachi, no change of machine or crew being made on this flight. That means that India is now within 5 or 6 days by air of possibly infected areas and the existing danger

will be considerably enhanced if the recent proposal to open an air route between Lagos and Khartum is carried into effect. Although it is understood that disinfestation operations are being carried out on all aircraft during voyages through Kenya, Uganda and the Sudan, the present arrangement is one which gives grave concern to those responsible for health conditions in India. To ensure this country's safety, it is urgently necessary that north bound aircraft and crews flying from East Africa should be changed at Cairo in order that possibly infected persons or insects shall not be carried to India.

In the meantime, the Government of India are actively engaged in providing the necessary buildings, equipment, staff, etc., in order to make Karachi Air Port an 'anti-amaryl' aerodrome, as defined by the Aerial Sanitary Convention. Existing arrangements as to health staff and the inspection of incoming aircraft, whilst perhaps suitable enough when arrivals and departures were limited in number, are no longer sufficient. Proposals have therefore been made to the Government of India in regard to the appointment of a whole-time health officer for the inspection of all incoming planes ; a trained staff for mosquito control of the aerodrome and its environment ; and the strict isolation of suspected persons arriving by air at Karachi air port. At the moment of writing, an officer of the Malaria Survey of India is in Karachi carrying out, under the auspices of the I. R. F. A., the experimental work outlined in Health Bulletin* 20 for the disinfestation of aircraft, etc. and it is hoped that within a short period Karachi air port will be manned and equipped in a manner suited to meet any possible emergency. But it must be remembered that the complete eradication of mosquitoes in and around even such a restricted area as an aerodrome is no light task and is one which will demand constant vigilance on the part of the health staff of the air port. If in the future, yellow fever should become more evident along the African air routes connected up with India by planes coming to Karachi from Egypt, it may be necessary for the Government of India to take more stringent precautions for the better protection of this country. The importance of changing aircraft and crews coming from East Africa before continuing the through journey to India has already been stressed. The only permissible exception to this rule would be in respect of crews who possessed certificates of having been properly immunised against the disease by a method approved by the Government of India. It might be necessary also to place a complete embargo on the transportation of passengers from endemic and infected areas, unless intending passengers were first quarantined in mosquito-proof observation blocks under strict supervision during a period equal to the incubation period of the disease prior to their being permitted to embark on a plane leaving for India. This proposal would no doubt be the cause of loud protest but the question for the Government of India to decide is whether, for the convenience of a few individuals, they would be justified in incurring the tremendous risk of infecting the population of India with yellow fever. It would provide a further factor of safety if the P. H. O. of Karachi aerodrome were to have at least 24 hours notice of the arrival of any plane coming directly from Africa. In any case, so long as crews are not being changed in Egypt during the flight from East Africa, it should be made compulsory for these crews to be in possession of certificates from a properly recognised authority at each of the ports of

* Suggestions with regard to the prevention of the spread of Yellow Fever to India by Air Traffic, with special reference to Insect Transmission by Lt.-Col. J. A. Sinton, M.D., D.Sc., I.M.S., Director, Malaria Survey of India, Kasauli.

call that they have not been exposed to risk and have been properly quarantined. Any person landing at Karachi without such a certificate should be liable to severe penalty and should be quarantined at the expense of the Company bringing him to India. These are only a few of the possible methods which may require adoption in order to ensure the safety of this country and others even more stringent may be necessary.

The position at the moment is certainly disquieting and it is impossible to accept the *laissez-faire* argument that because India has heretofore escaped from this disease nothing need be done. It must be realised that we have at Karachi and other air ports in India, a health problem of such vital importance to the people of this country that flight schedules and time tables will have to be subordinated in certain directions to public health requirements and that delays, and even prohibition, may be necessary should yellow fever infection continue to spread to other parts of East Africa through which the main air routes pass.

Medical Research.

216. Although mention has already been made in different sections of this report of the medical researches under investigation in India and brief descriptions have also been given of the numerous enquiries financed by the I. R. F. A. this concluding section of my report would be incomplete were I to fail to draw special attention to the value of the work which is being carried out in this important field. The I. R. F. A., in spite of the continued ' cut ' in its grants from the Government of India, has courageously proceeded with most of its larger and more important enquiries and has not hesitated to draw further from its invested capital in order to maintain the programme of research which its Scientific Advisory Board and Governing Body have considered essential. It has not, of course, been possible to find money sufficient to finance all the enquiries which might have received support in happier circumstances, but on the whole there has been less curtailment in research than in other medical and public health fields of activity and it is only fair to state that nothing of first importance has been eliminated. The I. R. F. A. has indeed sanctioned an expanded programme of research on cholera and, whilst the proposed Cholera Commission has not been instituted, the various enquiries connected with this disease and its causative organism have been co-ordinated by means of a Cholera Advisory Committee whose function is to control a planned scheme of research without interfering with the personal initiative and individuality of the different workers. Past experience, indeed, has shown that team work is essential if success is to be achieved in the investigation of a subject like cholera which possesses so many inherently different aspects and recent results have fully corroborated that experience. Important progress has already been made and there is every hope that considerable light will be thrown upon a number of the many problems associated with this disease. Further investigations on the cholera bacteriophage both in the field and in hospital have been included in the research programme in order, if possible, to reach definite conclusions as to the value of this ' entity ' in the prevention and treatment of the disease. This branch of cholera research has now been in progress in India for over 6 years and, whatever the eventual verdict may be, no one can deny that every effort has been made to assess correctly the part which cholera bacteriophage may play in the control of this epidemic disease.

The Malaria Survey of India is still entirely financed by the I. R. F. A. and whilst the annual grants for the maintenance of that organisation constitute a

considerable percentage of the annual budgets of the Association, the cost is minute in relation to the immensity of the malaria problems of this country and there can be no doubt that India obtains full value for the expenditure incurred. Whilst the Malaria Survey has not yet become an integral part of the Government of India's Public Health organisation, in actual practice it functions as such and the advice and services of its officers are always at the free disposal of central and local administrations in connection with malarial problems. Not the least important of its activities is the malaria training given annually to numbers of army and civil medical officers and private practitioners. The class held at the Ross Field Experimental Station for Malaria at Karnal each year continues to be of the greatest benefit to both the Governments and the peoples of India. It is perhaps superfluous to mention that the Director is also responsible for the editing and publication of the " Records of the Malaria Survey of India ", a journal which has attained a high place amongst scientific journals and whose pages are open to all accredited research work in the malaria field.

Nutritional research continues to occupy an important place in the programme sanctioned by the I. R. F. A. and at the laboratories at Coonoor, till recently under the direction of Major-General McCarrison, a whole series of important departments have been developed. As in other fields of research, additional lines of work have been gradually evolved and it is almost impossible to envisage what the future may have to give from these developments. Fortunately for India, the Governing Body of the I. R. F. A. has never failed to realise the importance of this branch of medical research and whilst there seems no immediate prospect of establishing an Institute of Nutrition such as already exists in many other countries, the basic requirements for progress have been satisfactorily provided in the Coonoor laboratories. A further desirable extension of the work has recently been sanctioned by the I. R. F. A. and plans are now being made for a comprehensive survey of the nutritive values of the common food-stuffs of the different provinces of India. Surveys of this kind have been carried out during the last 10 years in other countries, including Japan and the Philippines and similar work is now in progress in Malaya, China and Ceylon. In this direction there exists a lamentable gap in our knowledge and the need for more accurate knowledge of food values in India scarcely requires re-emphasising. Dr. Aykroyd, who has succeeded Sir Robert McCarrison as Director of the Nutritional Research Laboratories in Coonoor, has noted as follows on this line of research :—

" Knowledge of food values is essential if agricultural policy is to be closely related to dietary requirements. In the U. S. A., for example, future agricultural policy may be founded on the ideal of supplying a ' well balanced diet ' to the entire population of the country and, if this ideal is to be fulfilled, no estimate of the changes required in existing agricultural conditions could be made without precise knowledge of food values. Moreover, such knowledge is the essential basis of almost all public health nutrition work and of sound dietary education. Those concerned, also, with the regulation of diet in institutions, public and private, with teaching and propaganda work, etc., would find their problems simplified by the existence of authoritative tables of nutritive values to which they would turn. There appears to be considerable need in India for exact quantitative dietary surveys, the purpose of which is the correlation of diet with physical development, state of nutrition, the incidence of disease, etc. The collection of systematic knowledge about Indian foodstuffs would stimulate and facilitate surveys of this nature."

In this connection, notice may be taken of the fact that in recent numbers of ' Current Science ', more than one writer has stressed the need for the

establishment of a Central Nutrition Board for India. On this question, Professor B. C. Guha has made interesting suggestions. He writes :

"It is encouraging to note that some nutritional investigations are being carried on in India in different laboratories. While it is desirable in the interest of science that there should be some individuality about the researches that are being conducted at different centres, the necessity for a co-ordinating central organisation would appear to be paramount. Such an organisation may be entrusted with the task of (1) co-ordinating the nutritional work of different laboratories, (2) suggesting investigations of practical importance in relation to the varying climates, soils, habits, traditions, availability of food-stuffs, etc., in different parts of the country, and, especially, in relation to the purchasing power of different classes of people, and (3) making the results available to the general public in non-technical language. This board should work in close-co-operation with the Imperial Council of Agricultural Research and with the chief medical organisations of the country."

The proposal of the I. R. F. A. to carry out an investigation into the common food-stuffs of India seems to fit in with one of Professor Guha's suggestions and it may be stated that that proposal was only promulgated after full consultation with the I. C. A. R. One of the greatest difficulties has always been to ' get across ' to the general public the results obtained from research and no doubt every public health officer acquainted with this difficulty would heartily welcome any practical proposal with that end in view.

It is obviously impossible even to enumerate the different research enquiries now being carried out under the auspices of the I. R. F. A. and if a few of the more important have been given specific mention, that must not be taken to imply that the others are not of importance. For more detailed descriptions of these enquiries reference must be made to the report of the Scientific Advisory Board and to the Indian Journal of Medical Research and the Records of the Malaria Survey, the two journals published under the auspices of the Association. In addition, a considerable amount of valuable research work is also being carried out by various departments of the medical colleges situated in different parts of India and a brief description of the research activities of these colleges will be found on page 247 of this report. Although perhaps nothing very new has been said in this paragraph, its purport is plain ; the continued development of medical research is of vital importance to India and her peoples, for on these researches depend the progress of preventive medicine and the improvement of the public health of the country.

Conclusion.

217. The opinion has recently been expressed that the value of these all-India Health Reports is largely discounted by their tardy issue. *Prima facie*, this criticism is legitimate but there are difficulties which prohibit its acceptance. In the first place, the facts and figures which form the basis of these reviews are derived from the annual reports of provincial Directors of Public Health and those of other departments, societies and associations. Many of those reports cannot be ready for several months after the close of the year to which they refer and in certain instances they do not reach the Public Health Commissioner's office until 12 or more months have elapsed. Further, before any comments of value can be made provincial figures require careful correlation and study and under present conditions this has to be done in the midst of other multifarious and urgent duties. No doubt, if the Central Public Health Department were provided with a suitable staff of technical medical

assistants, the issue of the Public Health Commissioner's reports could be expedited and, what is more important, detailed critical review of the situation in different fields of public health could be prepared. In the absence of any such technical organisation, much of the available material cannot be given the careful examination it deserves and the question of earlier publication is one which must at present remain a mere hope for the future.

In last year's report, specific attention was invited to the " universal and often sweeping reductions " which had been made in public health budgets throughout the country. Preceding sections of this report have made it plain that these retrenchments are still in force ; in a number of directions, indeed, expenditure on public health has been even further reduced. In these circumstances, it is impossible to refrain from stressing once more the dangers to which the general population is exposed by the continuance of those so-called economies. These dangers have been less evident and less grave than they otherwise might, because during 1933 India has once more remained free from violent epidemics and has experienced another comparatively healthy year. But unjustifiable risks are still being taken and a heavy responsibility rests on all those who continue to take these risks. The epidemiological history of India does not permit of any degree of confidence in the prolongation of the present period of comparative freedom from epidemic outbursts and we have had a recent warning from the neighbouring island of Ceylon that such outbursts may flare up in devastating fashion without premonitory signs. Whilst there is no intention of giving expression to anything in the nature of scare headlines, known facts in regard to the epidemiology of disease in this country provide adequate reasons for sounding a warning note, in the hope that public health departments may be more suitably equipped before the next crisis arrives. Even though that crisis be further postponed,—a somewhat hazardous assumption,—the facts set out in previous pages of this report make it obvious that existing standards of public health in India are of a low order and, if these standards are to be suitably raised and necessary improvements are to be effected, a much larger proportion of available funds will have to be devoted to the social amelioration and protection afforded by well-planned public health work. In making demands for additional funds, public health departments are frequently accused of being mere ' spending ' departments ; on the contrary, in no sphere of human activity can richer dividends be earned than by judicious investment in the conservation and promotion of the health of the people. This fact requires constant reiteration especially at a time when governments, municipal committees and district boards alike are engaged in the search for further reductions in expenditure.

Retrenchments and ill-balanced budgets may give rise at times to feelings of despondency, and even despair, in the minds of public health officers but, in estimating progress in the public health, the long view is essential and there are features even in the present position from which fresh courage and renewed hope may be derived. For there can be no doubt that during the past 20 years considerable success has been achieved and, although existing circumstances are not favourable to increased activity and new developments, every effort must be made to ensure that progress is not stayed. Unfortunately, it is always much easier to arouse public sympathy and raise money for the care of the sick than to arouse the same sympathy or raise similar funds for the prevention of disease. " There are many reasons why this should be so, but in spite of the best of these reasons,—the humane promptings of pity towards our

fellows,—the old saying is still true—prevention is better than cure." To effect even the slightest reduction in the incidence of sickness, suffering and death must always be, as Sydenham said, " a matter of greater felicity than the riches of a Tantalus or a Croesus ". This great felicity is a reward already earned by many public health workers in this country and is one which should provide renewed strength for the further efforts demanded of them under the difficult conditions existing at the present time.

A. J. H. RUSSELL, *Lieut.-Col., I.M.S.,*
Public Health Commissioner with the Government of India.

SIMLA;
1st June 1935.

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Appendix I

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Section I.

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Station.	January.						February.						March.					
	Max.	Min.	Mean temp.	Dep.	Rain.	Dep.	Max.	Min.	Mean temp.	Dep.	Rain.	Dep.	Max.	Min.	Mean temp.	Dep.	Rain.	Dep.
Rangoon	92·4	66·8	79·6	+2·9	...	—0·21	92·4	67·5	79·9	+1·1	...	—0·22	95·5	71·7	83·6	+0·1	0·62	+0·30
Akyab	80·6	56·6	68·6	—1·5	...	—0·06	85·0	60·3	72·7	—0·1	...	—0·06	88·3	67·5	77·9	—0·6	...	—0·49
Sibsagar	71·4	51·5	61·5	+1·1	0·95	—0·34	73·7	57·1	65·4	+2·5	2·14	+0·13	84·4	60·7	72·5	+3·3	0·69	—4·09
Silchar	77·1	50·3	63·7	—1·5	0·49	—0·32	81·9	56·6	69·3	+1·1	0·42	—1·70	91·0	61·5	76·3	+1·7	1·53	—6·38
Chittagong	79·5	53·8	66·7	—0·1	...	—0·28	84·7	60·1	72·4	+1·9	...	—1·03	90·7	67·4	79·1	+2·0	0·55	—2·01
Narayanganj	76·8	53·3	65·1	—1·5	0·01	—0·29	83·1	61·1	72·1	+1·9	0·58	—0·86	93·3	67·8	80·5	+1·9	0·15	—2·54
Calcutta	76·3	54·2	65·3	—1·3	0·78	—0·44	83·3	63·9	73·6	+2·3	2·59	+1·49	93·3	70·6	81·9	+1·7	0·06	—1·38
Cuttack	82·5	59·1	70·8	—1·2	1·28	+1·01	86·1	63·7	74·9	—1·8	0·16	—0·60	97·9	69·6	83·7	—0·7	0·03	—1·08
Hazaribagh	70·5	46·8	58·7	—3·3	3·13	+2·41	77·2	55·7	66·5	+0·7	3·44	+2·31	86·9	61·7	74·3	—1·4	0·42	—0·62
Patna	72·2	48·5	60·3	—1·5	0·35	—0·18	81·9	57·6	69·7	+3·9	0·48	—0·05	93·2	65·8	79·5	+2·8	0·08	—0·39
Allahabad	72·8	44·5	58·7	—2·5	...	—0·76	82·6	54·2	68·4	+2·7	0·95	+0·37	93·4	63·5	78·5	+1·7	0·29	—0·02
Lucknow	71·7	44·8	58·3	—2·1	1·38	+0·61	80·7	53·5	67·1	+2·4	1·46	+0·69	92·1	61·7	76·9	+1·5	...	—0·35
Jhansi	73·8	44·4	59·1	—4·4	0·34	—0·25	82·5	54·1	68·3	+0·3	0·32	—0·13	92·3	62·9	77·6	—1·3	0·91	+0·62
Agra	69·3	39·4	54·3	—4·7	...	—0·54	78·5	48·1	63·3	+0·6	0·23	—0·25	90·2	57·3	73·7	+0·7	...	—0·35
Meerut(*)	...	...	...	...	0·36	—0·92	...	...	...	...	0·63	—0·25	...	...	...	...	0·57	—0·05
Delhi	66·8	41·4	54·1	...	0·06	—0·98	76·1	49·8	62·9	...	0·66	—0·10	86·4	58·1	72·3	...	0·26	—0·26
Lahore	63·5	36·8	50·1	—4·4	0·06	—0·99	73·6	47·1	60·3	+2·3	0·13	—0·81	81·5	53·9	67·7	—0·2	0·79	—0·07
Multan	68·0	41·3	54·7	—2·3	0·17	—0·25	76·6	50·4	63·5	+2·5	0·20	—0·16	86·9	58·6	72·7	+0·8	0·04	—0·39
Peshawar	62·3	38·1	50·2	—1·9	0·81	—0·75	68·9	45·2	57·1	+2·1	2·01	+0·66	75·7	51·6	63·7	+0·3	2·73	+0·48
Manora (Karachi)	74·0	56·8	65·4	—1·2	0·05	—0·47	73·9	62·0	67·9	—1·1	0·05	—0·34	82·1	67·5	74·8	—0·4	...	—0·33
Ajmer	71·4	43·3	57·3	—2·3	...	—0·36	77·3	51·1	64·2	+0·7	0·52	+0·27	87·1	59·8	73·5	—0·8	0·31	+0·12
Deesa	83·9	49·6	66·7	—0·7	...	—0·11	89·7	54·5	72·1	+1·7	...	—0·16	97·8	61·4	79·6	+0·1	...	—0·08
Indore	79·8	48·7	64·3	—0·6	...	—0·28	83·6	55·0	69·3	+1·7	0·18	...	92·4	61·6	77·0	+0·7	...	—0·06
Saugor	76·0	51·8	63·9	—0·7	...	—0·59	82·8	58·1	70·5	+2·5	0·24	—0·20	91·5	65·5	78·5	+0·7	0·41	+0·06
Jubbulpore	77·4	46·6	62·0	...	...	—0·80	84·0	54·0	69·0	...	1·58	+0·76	92·9	61·1	77·0	...	0·07	—0·50
Nagpur	85·9	56·1	71·0	+1·5	...	—0·42	90·3	63·1	76·7	+2·7	2·14	+1·54	96·6	67·9	82·3	—0·1	1·65	+1·13
Bombay	85·6	67·5	76·5	+1·7	...	—0·10	83·3	68·6	75·9	+0·9	...	—0·08	88·2	73·0	80·6	+1·9	...	—0·07
Belgaum	84·2	57·9	71·1	+0·4	...	—0·13	88·9	60·0	74·5	+0·6	...	—0·05	93·0	63·8	78·4	—0·3	1·29	+1·02
Bangalore	81·9	57·9	69·9	+0·7	...	—0·26	87·6	61·6	74·6	+1·4	0·30	+0·13	91·1	65·4	78·3	+0·3	0·03	—0·47
Madras	84·1	69·3	76·7	+0·5	...	—1·39	85·4	68·3	76·9	—0·7	...	—0·32	86·6	71·4	79·0	—1·6	3·42	+3·23
Bellary	86·0	62·5	74·3	—0·7	...	—0·11	92·7	69·7	81·2	+1·1	0·03	—0·13	96·5	72·6	84·5	—1·7	0·23	+0·03
Darjeeling	45·2	34·5	39·9	—1·3	1·05	+0·50	48·9	36·1	42·5	+1·0	0·31	—0·24	...	...	...	...	...	...
Mussooree	46·9	35·8	41·3	—1·5	0·73	...	51·8	38·9	45·3	+1·5	2·47	...	60·3	45·5	52·9	+0·1	1·33	...

(*) Reports only rainfall.

TABLE A.—MAXIMUM, MINIMUM, MEAN TEMPERATURE AND DEPARTURE FROM THE AVERAGE OF THE MEAN TEMPERATURE AT 32 STATIONS, AND RAINFALL WITH ITS DEPARTURE AT 33 STATIONS IN INDIA DURING 1933—*contd.*

Station.	April.						May.						June.					
	Max.	Min.	Mean temp.	Dep.	Rain.	Dep.	Max.	Min.	Mean temp.	Dep.	Rain.	Dep.	Max.	Min.	Mean temp.	Dep.	Rain.	Dep.
Rangoon	96·6	75·4	86·0	—1·1	3·95	+2·32	92·7	77·6	85·1	+0·7	13·44	+1·46	85·4	75·4	80·4	—1·0	25·56	+7·52
Akyab	88·8	73·6	81·2	—2·1	3·75	+1·68	89·1	77·3	83·2	—0·9	29·49	+15·54	83·7	76·3	80·0	—1·7	31·72	—15·22
Sibsagar	82·3	64·9	73·6	+0·1	14·60	+4·49	84·6	70·2	77·4	—1·1	6·40	—5·49	89·4	76·3	82·9	+0·5	21·65	+7·44
Silchar	88·7	67·9	78·3	+0·1	8·20	—6·13	89·1	72·3	80·7	+0·1	14·69	—0·90	89·7	76·5	83·1	+0·4	25·31	+3·63
Chittagong	87·8	72·3	80·1	—0·7	10·89	+5·42	89·1	76·0	82·5	+0·5	5·24	—4·28	86·7	77·0	81·9	+0·1	16·29	—4·50
Narayanganj	92·5	73·6	83·1	+0·1	11·10	+5·62	91·1	76·1	83·6	+0·1	8·38	—1·03	88·6	78·1	83·3	—0·1	12·43	—0·52
Calcutta	95·0	75·5	85·3	—0·3	3·16	+1·27	94·1	77·2	85·7	—0·5	7·48	+1·73	91·0	79·5	85·3	+0·2	15·71	+3·81
Cuttack	100·1	77·0	88·5	—0·9	1·04	—0·11	98·1	77·1	87·6	—2·9	7·06	+3·11	93·3	79·3	86·3	—1·2	12·93	+2·85
Hazaribagh	92·5	67·4	79·9	—5·0	1·11	+0·62	92·9	71·9	82·4	—5·1	5·75	+3·44	90·2	75·6	82·9	—1·7	11·37	+2·24
Patna	95·1	71·0	83·1	—3·1	1·31	+1·01	96·5	77·3	86·9	—1·8	3·65	+1·98	94·2	80·4	87·3	—0·5	7·01	—1·11
Allahabad	98·9	66·7	82·8	—4·6	1·72	+1·57	99·3	77·5	88·4	—4·7	1·86	+1·52	100·1	82·1	91·1	—0·8	4·14	—0·82
Lucknow	96·9	69·8	83·3	—2·7	1·90	+1·64	98·3	76·9	87·6	—3·7	1·37	+0·36	100·1	82·3	91·2	—0·3	2·86	—1·61
Jhansi	98·7	70·5	84·6	—4·9	0·86	+0·71	101·1	78·4	89·7	—6·2	1·53	+1·15	101·8	84·5	93·1	—1·1	9·64	+5·34
Agra	97·3	65·4	81·3	—3·4	0·41	+0·17	100·0	75·7	87·9	—4·4	1·15	+0·68	101·8	83·1	92·5	—2·1	10·21	+7·86
Meerut(*)	...	...	...	...	0·22	—0·21	...	...	...	...	1·66	+1·01	...	...	...	...	16·19	+13·06
Delhi	94·2	67·2	80·7	...	0·02	—0·37	96·6	74·8	85·7	...	2·11	+1·53	99·4	81·1	90·3	...	15·67	+12·68
Lahore	89·6	63·0	76·3	—2·6	0·71	+0·17	99·9	73·5	86·7	—1·1	0·17	—0·53	106·8	82·0	94·4	+1·9	1·21	—0·47
Multan	93·0	67·7	80·3	—2·6	0·13	—0·14	104·1	78·5	91·3	—1·1	0·18	—0·17	111·3	85·7	98·5	+2·0	0·02	—0·60
Peshawar	81·7	58·8	70·3	—2·4	1·04	—0·81	96·7	69·8	83·3	—0·3	0·30	—0·52	105·5	78·0	91·7	+0·7	0·42	+0·06
Manora (Karachi)	85·9	74·7	80·3	+0·5	0·05	—0·12	88·7	79·5	84·1	+0·3	0·22	+0·15	90·3	83·0	86·7	+0·3	...	—0·86
Ajmer	93·7	68·0	80·9	—4·0	1·10	+0·93	96·5	77·2	86·9	—4·9	2·34	+1·74	98·0	80·9	89·5	—1·7	9·91	+7·50
Deesa	104·8	72·0	88·4	+0·9	0·03	...	102·7	78·3	90·5	—1·7	1·75	+1·32	102·2	80·9	91·5	+0·2	0·45	—1·73
Indore	98·2	69·4	83·8	—1·1	0·03	—0·11	98·1	74·9	86·5	—3·0	0·91	+0·33	93·4	75·6	84·5	—0·9	9·93	+4·23
Saugor	97·1	71·4	84·3	—2·5	0·95	+0·80	98·2	75·7	86·9	—4·9	0·77	+0·27	96·2	77·4	86·8	—1·5	8·95	+2·48
Jubbulpore	98·4	66·5	82·5	...	0·32	+0·07	97·5	73·5	85·5	...	6·35	+5·82	95·5	76·9	86·2	...	4·75	—2·57
Nagpur	102·2	73·3	87·7	—2·5	1·30	+0·74	100·8	76·0	88·4	—6·8	3·96	+3·13	96·1	75·9	86·0	—2·9	6·61	—2·35
Bombay	90·5	77·8	84·1	+2·1	...	—0·05	91·0	79·6	85·3	+0·3	2·85	+2·01	88·6	78·9	83·7	+0·4	10·29	—8·02
Belgaum	94·8	67·6	81·2	—0·3	3·23	+1·63	90·2	68·6	79·4	—1·3	5·22	+2·76	78·5	68·0	73·3	—1·5	9·35	+1·21
Bangalore	94·5	70·0	82·3	+0·8	0·94	—0·39	88·8	69·5	79·1	—1·3	7·71	+3·35	82·8	66·5	74·7	—1·3	1·78	—1·11
Madras	91·3	77·5	84·4	—0·3	0·03	—0·50	94·5	80·3	87·4	—2·0	0·07	—1·00	98·8	81·6	90·2	+0·7	0·75	—1·14
Bellary	100·0	77·9	88·9	—1·5	1·49	+0·73	96·5	76·8	86·7	—3·3	5·45	+3·49	89·6	75·5	82·5	—2·9	1·14	—0·73
Darjeeling	58·0	46·0	52·0	—3·5	9·73	+5·88	61·2	51·4	56·3	—2·1	11·32	+2·62	63·5	56·3	59·9	—0·5	22·42	—1·84
Mussooree	64·9	48·2	56·5	—5·7	3·09	...	68·0	54·7	61·3	—6·7	5·65	...	72·9	60·0	66·5	—2·7	17·01	...

(*) Reports only rainfall.

TABLE A.—MAXIMUM, MINIMUM, MEAN TEMPERATURE AND DEPARTURE FROM THE AVERAGE OF THE MEAN TEMPERATURE AT 32 STATIONS, AND RAINFALL WITH ITS DEPARTURE AT 33 STATIONS IN INDIA DURING 1933—*contd.*

Station.	July.						August.						September.					
	Max.	Min.	Mean temp.	Dep.	Rain.	Dep.	Max.	Min.	Mean temp.	Dep.	Rain.	Dep.	Max.	Min.	Mean temp.	Dep.	Rain.	Dep.
Rangoon	85·9	75·3	80·6	+0·1	18·75	—2·67	85·7	76·4	81·1	+0·7	14·32	—5·55	86·7	76·1	81·4	+0·5	16·12	+0·85
Akyab	83·3	76·9	80·1	—0·7	33·64	—21·16	84·1	75·9	80·0	—0·7	29·36	—15·83	86·4	77·0	81·7	—0·2	27·62	+5·05
Sibsagar	89·4	77·7	83·5	+0·1	20·49	+3·48	89·8	76·9	83·3	+0·3	21·00	+4·73	90·1	76·6	83·3	+1·5	10·47	—1·23
Silchar	91·3	76·5	83·9	+0·3	23·51	+3·77	88·6	75·9	82·3	—0·9	25·76	+6·01	91·6	76·2	83·9	+0·9	8·92	—5·49
Chittagong	86·5	76·9	81·7	+0·5	31·58	+9·18	85·1	75·7	80·4	—0·7	38·59	+19·29	88·0	76·5	82·3	+0·7	12·27	+0·34
Narayanganj	88·0	78·9	83·5	—0·1	18·56	+5·58	87·1	78·2	82·7	—0·7	15·00	+2·26	89·2	78·1	83·7	+0·1	13·09	—3·46
Calcutta	88·1	79·5	83·8	+0·1	17·18	+4·67	88·3	78·3	83·3	+0·1	14·70	+2·01	88·4	78·4	83·4	+0·3	10·49	+0·62
Cuttack	87·7	78·0	82·9	—1·5	16·81	+5·10	88·8	78·0	83·4	—0·4	32·41	+18·75	89·8	77·1	83·5	—0·7	13·01	+3·44
Hazaribagh	84·9	73·8	79·3	—0·3	13·84	+1·40	84·0	72·7	78·3	—0·3	8·52	—4·62	84·9	72·1	78·5	...	6·51	—2·67
Patna	90·2	80·2	85·2	+0·1	8·29	—3·65	88·6	78·7	83·7	—0·6	20·60	+7·05	90·6	79·7	85·1	+1·0	7·22	—1·11
Allahabad	92·1	79·6	85·9	—0·5	5·84	—5·87	91·7	78·6	85·1	+0·9	9·29	—2·41	91·6	76·9	84·3	+0·1	3·68	—1·99
Lucknow	92·0	79·6	85·8	—0·1	4·18	—7·27	93·0	79·3	86·1	+1·6	3·00	—7·89	91·5	77·2	84·3	+0·3	5·81	—1·26
Jhansi	92·2	78·8	85·5	—0·5	8·38	—3·19	88·6	76·2	82·4	—1·0	8·08	—3·17	89·4	75·0	82·2	—1·7	9·29	+3·37
Agra	91·9	79·1	85·5	—2·1	4·19	—4·93	89·2	76·3	82·7	—2·5	10·97	+2·82	88·0	74·5	81·3	—3·1	9·02	+4·97
Meerut (*)	...	...	...	...	7·51	—1·58	...	...	...	...	6·57	—2·12	...	...	...	...	5·79	—0·28
Delhi	91·3	78·7	85·0	...	5·12	—2·41	88·1	76·9	82·5	...	21·71	+14·29	88·0	75·7	81·9	...	13·46	+8·68
Lahore	98·9	81·6	90·3	+0·5	3·70	—1·78	90·3	77·9	84·1	—3·7	9·38	+4·05	90·9	74·7	82·8	—2·3	3·09	+0·73
Multan	105·8	85·0	95·4	+1·0	0·36	—1·66	97·7	80·0	88·9	—2·9	2·13	+0·15	98·2	76·1	87·1	—1·9	3·36	+2·95
Peshawar	102·3	83·3	92·8	+1·8	0·53	—0·71	93·5	77·8	85·7	—2·7	4·93	+2·69	93·5	73·4	83·5	+0·3	1·19	+0·38
Manora (Karachi)	88·2	80·3	84·3	—0·5	15·44	+12·50	84·9	77·2	81·1	—0·9	3·03	+1·36	87·2	77·4	82·3	+1·1	1·27	+0·85
Ajmer	90·6	78·0	84·3	—0·7	6·60	+0·14	84·4	74·6	79·5	—2·5	10·75	+4·00	86·7	73·7	80·2	—2·2	2·93	+0·26
Deesa	93·5	78·9	86·2	+0·6	7·50	—1·50	88·1	75·5	81·8	—0·9	26·13	+17·51	93·4	74·9	84·1	+0·4	3·08	—0·46
Indore	84·9	73·2	79·1	...	14·63	+4·76	82·2	71·4	76·8	—0·2	15·55	+7·54	84·0	69·9	76·9	—0·8	10·42	+3·89
Saugor	87·2	74·7	80·9	+0·9	11·42	—2·52	84·1	72·4	78·3	+0·1	10·56	—3·09	84·0	70·9	77·5	—1·5	14·86	+7·92
Jubbulpore	87·4	74·6	81·0	...	15·39	—2·23	86·2	73·8	80·0	...	15·76	—1·10	85·7	72·4	79·1	...	17·30	+9·03
Nagpur	89·3	74·5	81·9	+0·2	21·90	+8·06	87·2	73·7	80·5	—0·3	17·66	+6·02	87·8	73·2	80·5	—0·9	14·78	+6·53
Bombay	87·7	78·5	83·1	+2·1	14·13	—10·13	84·9	76·6	80·7	+0·3	18·81	+5·01	86·0	76·3	81·1	+0·7	12·31	+1·81
Belgaum	77·6	67·7	72·7	+1·0	16·55	+0·40	78·5	67·0	72·7	+1·4	12·20	+2·53	79·8	66·3	73·1	+0·7	5·83	+0·95
Bangalore	81·5	66·2	73·9	—0·3	5·71	+1·53	81·6	66·7	74·1	+0·3	10·27	+4·89	81·6	65·3	73·5	—0·5	4·07	—2·91
Madras	96·5	79·8	88·1	+1·3	1·08	—2·86	92·7	78·8	85·7	+0·3	3·00	—1·64	93·6	78·5	86·1	+1·4	1·20	—3·79
Bellary	88·8	74·8	81·8	—1·3	2·28	+0·43	87·0	73·0	80·0	—2·3	11·01	+8·69	87·0	72·3	79·7	—2·1	7·70	+2·62
Darjeeling	65·8	56·8	61·3	—1·1	30·85	—1·46	65·5	56·3	60·9	—1·1	23·78	—2·34	65·8	55·1	60·5	—0·2	18·53	+0·15
Mussooree	68·4	60·4	64·4	—1·5	29·25	...	67·7	59·3	63·5	—0·9	30·11	...	66·2	57·2	61·7	—2·1	14·85	...

(*) Reports only rainfall.

TABLE A.—MAXIMUM, MINIMUM, MEAN TEMPERATURE AND DEPARTURE FROM THE AVERAGE OF THE MEAN TEMPERATURE AT 32 STATIONS, AND RAINFALL WITH ITS DEPARTURE AT 33 STATIONS IN INDIA DURING 1933—*concld.*

Station.	October.						November.						December.					
	Max.	Min.	Mean temp.	Dep.	Rain.	Dep.	Max.	Min.	Mean temp.	Dep.	Rain.	Dep.	Max.	Min.	Mean temp.	Dep.	Rain.	Dep.
Rangoon	88·9	76·1	82·5	+0·8	7·14	+0·23	88·0	72·7	80·3	+0·3	3·80	+1·01	88·8	66·5	77·7	+0·4	...	—0·37
Akyab	87·5	76·1	81·8	+0·1	9·62	—1·29	85·7	70·0	77·9	+0·1	4·20	—1·28	81·2	61·2	71·2	—0·7	...	—0·76
Sibsagar	86·3	72·4	79·3	+2·0	4·51	—0·59	80·6	59·7	70·1	+1·5	0·94	—0·16	73·6	51·5	62·5	+1·6	0·09	—0·43
Silchar	91·1	73·1	82·1	+1·7	7·28	+0·73	87·4	61·4	74·4	+0·1	...	—1·40	80·5	54·7	67·6	+0·5	...	—0·39
Chittagong	89·4	75·6	82·5	+2·5	5·02	—1·86	85·8	65·8	75·8	+1·4	0·50	—1·37	80·7	56·5	68·6	+0·8	...	—0·70
Narayanganj	89·8	75·9	82·9	+1·3	2·71	—2·36	85·9	65·4	75·7	+0·9	...	—0·98	80·3	57·6	68·9	+1·4	...	—0·19
Calcutta	88·0	74·8	81·4	+0·5	9·71	+5·52	83·5	65·7	74·6	+1·1	...	—0·66	77·9	57·8	67·9	+1·3	...	—0·20
Cuttack	90·3	74·4	82·3	+0·1	4·97	—0·23	86·8	65·0	75·9	+0·3	0·16	—1·37	82·9	58·7	70·8	+0·9	...	—0·28
Hazaribagh	83·6	65·2	74·4	—0·9	2·94	—0·18	77·4	52·6	65·0	—2·7	...	—0·37	72·3	46·7	59·5	—1·9	...	—0·21
Patna	89·4	73·9	81·7	+1·1	1·21	—1·33	83·1	60·2	71·7	+0·3	...	—0·28	76·2	52·5	64·3	+1·4	...	—0·09
Allahabad	90·5	69·6	80·1	+0·7	1·90	—0·42	83·9	54·8	69·3	...	0·10	—0·32	76·6	48·3	62·5	+0·7	0·01	—0·22
Lucknow	90·3	68·5	79·4	+0·7	3·64	+2·46	83·6	54·5	69·1	+0·5	...	—0·19	76·5	48·7	62·6	+1·5	...	—0·28
Jhansi	90·3	66·4	78·3	—3·0	1·47	+0·60	84·5	55·4	69·9	—2·1	0·46	+0·29	78·5	49·0	63·7	—0·9	0·03	—0·20
Agra	89·8	63·3	76·5	—1·3	1·30	+0·54	83·8	49·7	66·7	—0·7	...	—0·12	74·6	44·2	59·4	—1·3	...	—0·27
Meerut (*)	...	...	...	...	2·73	+2·17	...	...	...	...	...	—0·15	...	...	...	...	0·13	—0·28
Delhi	87·9	65·4	76·7	...	1·28	+0·96	81·3	51·9	66·6	...	...	—0·11	73·4	47·7	60·5	...	0·01	—0·39
Lahore	92·1	62·7	77·4	+0·5	...	—0·25	81·8	49·2	65·5	+0·4	0·36	+0·29	73·4	44·3	58·9	+2·5	...	—0·36
Multan	95·7	65·3	80·5	—0·2	...	—0·05	85·5	55·7	70·6	+1·5	...	—0·07	76·1	48·4	62·3	+3·1	0·15	—0·07
Peshawar	89·1	61·3	75·2	+1·1	0·07	—0·09	80·2	50·3	65·3	+2·5	...	—0·28	71·3	43·5	57·4	+3·9	...	—0·59
Manora (Karachi)	87·7	73·9	80·8	+0·4	...	—0·01	85·6	69·0	77·3	+1·6	...	—0·04	79·7	62·7	71·2	+2·3	...	—0·14
Ajmer	89·4	62·3	75·9	—2·4	0·09	—0·24	83·9	51·5	67·7	—0·5	0·77	+0·59	76·5	45·9	61·2	+0·1	0·01	—0·27
Deesa	99·2	67·3	83·3	+1·1	...	—0·41	95·9	56·6	76·3	+1·1	0·02	—0·08	87·8	50·4	69·1	+0·1	...	—0·04
Indore	89·0	62·5	75·7	—1·5	1·20	+0·05	83·5	55·4	69·5	+0·1	0·12	—0·29	79·0	48·8	63·9	—0·9	0·38	+0·17
Saugor	86·5	65·9	76·2	—1·1	0·67	—0·35	81·8	59·2	70·5	+0·3	0·04	—0·42	76·9	54·0	65·5	+0·7	0·01	—0·43
Jubbulpore	86·7	65·1	75·9	...	2·91	+1·10	82·2	52·5	67·3	...	0·06	—0·51	77·8	46·5	62·1	...	0·12	—0·17
Nagpur	89·0	68·3	78·7	—0·8	4·93	+2·83	85·4	59·8	72·6	—0·2	0·94	+0·23	81·7	55·4	68·5	+0·6	0·17	—0·37
Bombay	90·0	75·9	82·9	+0·9	3·04	+0·88	90·3	73·9	82·1	+1·3	0·01	—0·40	86·2	69·5	77·9	+0·4	0·93	+0·88
Belgaum	82·5	65·2	73·9	—0·5	10·43	+5·76	83·9	62·1	73·0	+1·0	2·20	+0·46	81·0	56·3	68·7	—1·5	0·28	—0·09
Bangalore	81·2	65·1	73·1	—0·5	8·05	+2·15	82·6	63·0	72·8	+1·8	0·19	—2·75	79·4	59·1	69·3	+0·5	2·25	+1·77
Madras	86·8	75·5	81·1	—0·9	9·87	—1·85	84·7	72·4	78·5	—0·3	5·76	—8·49	82·6	68·9	75·7	—0·9	15·00	+9·19
Bellary	87·6	71·2	79·4	—1·4	5·85	+1·95	86·2	66·9	76·5	—0·3	1·42	—0·77	82·8	63·0	72·9	—0·9	0·78	+0·67
Darjeeling	62·1	50·4	56·3	+0·3	9·41	+4·87	55·2	42·6	48·9	—0·3	0·74	—0·04	49·4	37·1	43·3	+0·2	0·16	—0·08
Mussoorie	62·8	50·5	56·7	—1·4	7·01	...	58·3	44·6	51·5	—0·2	0·02	...	53·6	39·5	46·5	+0·9	0·03	...

(*) Reports only rainfall.

TABLE B.—POPULATIONS (UNDER REGISTRATION) ACCORDING TO 1931 CENSUS COMPARED WITH ESTIMATED POPULATIONS ON 30TH JUNE, 1933.

	Rural.		Urban.		Total.		Male.		Female.	
	Census.	Estimated.	Census.	Estimated.	Census.	Estimated.	Census.	Estimated.	Census.	Estimated.
BRITISH INDIA .	239,216,274	245,611,750	26,472,590	27,002,080	265,688,864	272,612,830	136,882,928	140,436,395	128,805,936	132,177,435
N. W. F. P	2,043,537	2,090,563	315,174	321,843	2,358,711	2,412,406	1,268,513	1,300,171	1,090,198	1,112,235
Punjab .	20,337,938	21,128,645	3,122,329	3,224,048	23,460,267	24,352,693	12,798,121	13,265,529	10,662,146	11,087,164
Delhi .	197,066	205,972	439,180	454,266	636,246	660,238	369,497	382,269	266,749	277,969
U. P. .	44,665,155	45,820,414	3,743,608	3,844,923	48,408,763	49,665,337	25,445,006	26,092,758	22,963,757	23,572,579
B. & O. .	36,265,937	37,198,217	1,411,639	1,434,278	37,677,576	38,627,495	18,794,138	19,258,401	18,883,438	19,369,094
Bengal .	46,389,495	47,084,723	3,511,585	3,518,119	49,901,080	50,602,842	25,927,428	26,297,984	23,973,652	24,304,858
C P. . .	13,844,061	14,289,242	1,663,662	1,718,846	15,507,723	16,008,088	7,761,818	8,003,704	7,745,905	8,004,384
Bombay .	17,605,704	18,163,624	4,203,052	4,266,941	21,808,756	22,430,565	11,458,782	11,784,717	10,349,974	10,645,848
Madras .	38,907,511	40,187,274	6,268,369	6,412,575	45,175,880	46,599,849	22,303,255	23,047,532	22,872,625	22,552,317
Coorg .	153,500	154,470	9,827	9,663	163,327	163,133	90,575	90,905	72,752	73,228
Assam . .	7,733,479	7,920,424	194,474	199,510	7,927,953	8,119,934	4,187,085	4,282,100	3,740 868	3,837,834
Burma . .	10,692,798	10,983,575	1,409,492	1,418,119	12,102,290	12,401,694	6,182,629	6,329,661	5,919,661	6,072,033
Ajmer-Merwara .	380,093	389,607	180,199	178,949	560,292	568,556	296,081	300,664	264,211	267,892

Table C.—Estimated Population by Sex and Age.

	N. W. F. P.		Punjab.		Delhi.		U. P.		B. & O.		Bengal.		C. P.	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
Under 1 year .	38,541	36,762	45,691	38,361	10,492	10,361	766,770	769,315	470,909	480,029	838,453	841,554	277,035	283,071
1— 5 years .	158,656	155,265	1,509,341	1,448,013	35,524	34,685	2,979,768	3,007,576	2,330,325	2,462,655	3,044,934	3,132,360	948,154	994,169
5—10 years .	184,869	151,167	1,741,884	1,505,013	40,727	34,454	3,688,599	2,872,758	2,708,208	2,492,782	3,597,694	3,192,574	1,029,225	992,908
10—15 years .	165,011	125,051	1,618,526	1,325,800	41,055	32,694	3,085,049	2,517,948	2,359,22	2,096,486	3,147,780	2,811,949	931,404	880,420
15—20 years .	114,467	98,524	1,239,405	1,022,499	43,205	30,185	2,362,176	2,067,848	1,602,604	1,662,616	2,304,190	2,568,310	704,951	739,236
20—30 years .	223,892	212,481	2,300,092	1,928,461	84,376	56,639	4,660,332	4,302,054	3,297,711	3,510,336	4,973,076	4,801,873	1,419,326	1,446,119
30—40 years .	178,786	151,277	1,727,594	1,351,716	62,192	36,591	3,776,944	3,373,557	2,781,103	2,807,824	3,894,998	3,118,727	1,114,110	1,087,538
40—50 years .	113,232	91,550	1,191,344	941,410	36,452	21,634	2,634,918	2,279,712	1,911,114	1,858,177	2,462,024	1,912,924	798,312	747,345
50—60 years .	68,070	52,555	783,962	596,634	18,396	12,214	1,515,708	1,378,877	1,096,178	1,128,187	1,314,032	1,122,382	462,310	457,820
60 years and over	54,646	37,601	696,477	518,054	11,977	8,512	982,188	994,907	701,025	870,001	876,827	802,206	318,877	375,758

	Bombay.		Madras.		Coorg.		Assam.		Burma.		Ajmer-Merwara.		Total.	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
Under 1 year .	332,263	334,159	642,737	662,352	2,135	2,200	141,424	108,086	159,842	169,391	9,417	9,515	4,147,304	4,156,235
1— 5 years .	1,328,949	1,346,962	2,677,869	2,756,304	7,568	7,718	220,926	164,782	670,839	697,772	33,513	33,860	15,945,708	16,240,185
5—10 years .	1,527,181	1,373,664	3,021,731	3,036,821	9,562	9,148	405,671	285,572	772,442	761,609	36,972	32,612	18,406,490	16,666,342
10—15 years .	1,367,376	1,179,988	2,778,991	2,638,466	10,029	9,020	639,931	484,083	721,831	696,995	34,937	29,560	16,901,387	14,828,918
15—20 years .	1,029,441	978,316	2,014,946	2,159,842	9,162	7,559	760,529	738,699	588,055	608,782	30,023	26,504	12,801,559	12,712,728
20—30 years .	2,166,468	2,012,141	3,866,960	4,450,119	19,690	15,339	353,275	390,854	1,165,576	1,117,384	56,122	48,641	24,433,155	24,297,093
30—40 years .	1,830,096	1,480,398	3,280,924	3,261,238	16,399	10,379	492,339	438,414	925,744	780,220	40,532	35,398	20,123,689	17,932,234
40—50 years .	1,152,914	959,801	2,299,912	2,170,049	9,412	5,963	579,080	523,649	607,986	542,393	32,068	26,392	13,828,054	12,085,897
50—60 years .	637,238	572,217	1,394,382	1,381,499	4,434	3,469	553,879	570,660	396,344	381,740	17,950	15,193	8,261,026	7,670,653
60 years and over	412,791	408,202	1,069,079	1,110,962	2,513	2,433	135,044	136,034	321,026	315,850	9,131	10,217	5,588,027	5,587,146

TABLE D.—BIRTHS.

	Births.			Birth rate p. m.			Males born to every 1000. females.	Excess of birth rate over death rate.
	M.	F.	Total.	M.	F.	Total.		
BRITISH INDIA	5,028,170	4,650,706	9,678,876	18·4	17·1	35·5	108	13·1
N.-W. F. P.	40,110	30,763	70,873	17	13	29	130	9
Punjab	549,975	492,649	1,042,624	23	20	43	112	16
Delhi	14,835	13,886	28,721	23	21	44	107	12
U. P.	1,006,021	892,513	1,898,534	20	18	38	113	20
B. & O.	690,914	656,034	1,346,948	18	17	35	105	13
Bengal	764,203	709,741	1,473,944	15	14	29	107	5
C. P.	352,494	333,776	686,270	22	21	43	106	17
Bombay	412,227	381,506	793,733	18	17	35	108	11
Madras	872,879	831,366	1,704,245	19	18	37	105	14
Coorg	2,090	1,972	4,062	13	12	25	106	1
Assam	126,882	119,236	246,118	16	15	30	106	11
Burma	183,946	177,012	360,958	15	14	29	104	11
Ajmer-Merwara	11,594	10,252	21,846	20	18	38	113	10

TABLE E.—TOTAL BIRTHS BY MONTHS.

	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.	Rate p. m. 1933.	Rate p. m. 1932.
BRITISH INDIA	825,668	756,035	790,247	726,224	718,224	682,779	757,517	833,493	858,712	923,545	928,687	877,745	9,678,876	35·5	33·7
N. W. F. P.	5,634	6,242	5,963	5,400	6,162	4,564	5,217	5,792	6,792	6,113	6,348	6,646	70,873	29	29
Punjab	20,644	80,590	79,111	64,191	64,519	66,731	85,125	97,512	101,273	109,660	104,798	98,470	1,042,624	43	41
Delhi	2,206	1,824	1,805	1,655	1,764	2,037	2,707	2,943	3,116	3,263	2,776	2,625	28,721	44	43
U. P.	149,784	139,809	132,469	126,847	126,694	122,827	154,229	188,285	197,922	190,971	193,892	174,805	1,898,534	38	34
B. & O.	117,923	110,967	117,442	108,556	110,827	97,461	97,802	112,935	119,519	128,235	120,809	109,972	1,346,948	35	33
Bengal	146,884	141,992	147,546	124,982	109,540	95,873	89,541	85,153	89,891	127,753	160,402	154,387	1,473,944	29	26
C. P.	56,028	47,581	54,725	51,767	50,848	46,327	54,183	64,118	65,615	70,865	64,280	60,033	686 270	43	45
Bombay	65,079	57,555	66,743	62,114	61,932	59,476	63,322	70,654	71,440	75,233	71,725	68,460	793,738	35	35
Madras	128,115	117,148	133,268	132,119	140,043	139,842	155,092	160,024	156,393	158,409	144,374	139,418	1,704 245	37	35
Coorg	330	325	358	405	439	346	360	330	324	317	247	281	4,062	25	26
Assam	27,770	23,151	20,753	18,361	15,748	14,844	14,754	14,848	18,125	23,831	26,055	27,883	246,118	30	30
Burma	33,299	27,283	28,546	28,467	28,163	30,978	33,215	28,718	26,236	31,920	31,353	32,780	360,958	29	27
Ajmer-Merwara	1,972	1,568	1,518	1,360	1,545	1,473	2,020	2,186	2,066	1,975	2,178	1,985	21,846	38	35

Table F.—Deaths.

	Estimated population.	Area in sq. miles.	Density per sq. mile.	Deaths. M.	Deaths. F.	Deaths. Total.	Death rate *p. m.* M.	Death rate *p. m.* F.	Death rate *p. m.* Total.
British India	**272,612,830**	**890,646**	**306**	**3,158,373**	**2,938,414**	**6,096,787**	**22.5**	**22.2**	**22.4**
N.-W. F. P.	2,412,406	13,308	181	27,059	23,144	50,203	21	21	21
Punjab	24,352,693	96,614	252	343,398	317,144	660,542	26	29	27
Delhi	660,238	578	1,142	10,591	10,477	21,068	28	38	32
U. P.	49,665,337	106,248	467	483,996	420,892	904,888	19	18	18
B. & O.	38,627,495	83,054	465	430,908	402,489	833,397	22	21	22
Bengal	50,602,842	72,514	698	613,770	584,115	1,197,885	23	24	24
C. P.	16,008,088	99,920	160	218,418	193,381	411,799	27	24	26
Bombay	22,430,565	123,599	182	278,702	261,975	540,677	24	25	24
Madras	46,599,849	142,277	328	538,295	530,628	1,068,923	23	23	23
Coorg	163,133	1,593	103	2,048	1,883	3,931	23	26	24
Assam	8,119,934	31,332	259	84,464	76,590	161,054	20	20	20
Burma	12,401,694	116,848	106	118,364	108,087	226,451	19	18	18
Ajmer-Merwara	568,556	2,711	210	8,360	7,609	15,969	28	28	28

Table G.—Deaths by Months.

	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sep.	Oct.	Nov.	Dec.	Total.	Rate *per mille.* 1933.	Rate *per mille.* 1932.
British India	**518,662**	**435,105**	**463,904**	**485,941**	**480,979**	**469,209**	**465,549**	**479,781**	**485,833**	**567,310**	**629,866**	**614,648**	**6,096,787**	**22·4**	**21·6**
N.-W. F. P.	4,880	4,736	3,930	3,116	3,347	3,807	3,798	3,214	3,182	4,197	5,895	6,101	50,203	21	20
Punjab	55,131	45,108	42,194	40,200	48,303	51,660	43,664	40,129	48,661	80,062	92,427	73,002	660,542	27	24
Delhi	1,618	1,585	1,566	1,588	1,554	1,772	1,170	1,239	1,465	2,583	2,879	2,049	21,068	32	24
U. P.	68,741	64,933	71,356	86,108	87,105	81,952	73,653	73,459	69,031	70,705	81,120	76,725	904,888	18	22
B. & O.	66,282	55,437	63,024	73,271	75,864	67,369	63,611	72,719	67,727	75,809	80,467	71,817	833,397	22	20
Bengal	113,819	90,238	92,663	99,493	87,511	82,937	85,756	84,495	83,520	103,493	132,231	144,729	1,197,885	24	20
C. P.	32,427	28,984	34,066	34,827	31,150	28,324	28,875	34,455	38,922	41,400	41,326	37,043	411,799	26	27
Bombay	50,479	42,726	45,896	40,104	36,472	35,743	40,031	45,134	47,438	52,152	53,611	50,891	540,677	24	23
Madras	90,151	75,161	81,960	77,742	80,512	82,611	88,654	90,856	92,546	98,621	99,693	110,416	1,068,923	23	22
Coorg	364	251	242	296	367	420	403	335	352	328	258	315	3,931	24	23
Assam	13,745	10,909	10,027	11,589	12,126	14,746	14,407	11,821	12,243	14,981	16,932	17,528	161,054	20	19
Burma	19,688	13,748	15,597	16,066	14,810	16,347	20,599	20,913	19,508	21,711	21,665	25,799	226,451	18	17
Ajmer-Merwara	1,337	1,289	1,383	1,541	1,858	1,521	928	1,012	1,238	1,267	1,362	1,233	15,969	28	25

TABLE H.—DEATH RATES *PER MILLE* BY MONTHS.

	Jan.	Feb.	March.	April.	May.	June.	July	Aug.	Sept.	Oct.	Nov.	Dec.
BRITISH INDIA	**22**	**21**	**20**	**22**	**21**	**21**	**20**	**21**	**22**	**25**	**28**	**27**
N.-W. F. P.	24	26	19	16	16	19	18	16	16	20	30	30
Punjab	27	24	20	20	23	26	21	19	24	39	46	35
Delhi	29	31	28	29	28	33	21	22	27	46	53	37
U. P.	12	17	13	21	16	20	13	13	17	13	20	14
B. & O.	20	19	19	23	23	21	20	22	22	23	26	22
Bengal	26	23	23	24	20	20	20	20	20	24	32	33
C. P.	24	24	25	27	23	22	21	25	30	31	31	27
Bombay	27	25	24	22	19	19	21	24	26	27	29	27
Madras	23	21	21	20	20	22	22	23	24	25	26	28
Coorg	26	20	18	22	27	31	29	24	26	24	19	23
Assam	20	18	15	17	18	22	21	17	18	22	25	25
Burma	19	14	16	16	14	16	20	20	19	21	21	24
Ajmer-Merwara	28	30	29	33	38	33	19	21	26	26	29	26

TABLE I.—DEATHS BY MONTHS IN RURAL AREAS.

	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sep.	Oct.	Nov.	Dec.	Total.	Rate p. m. 1933.	Rate p. m. 1932.
BRITISH INDIA	**466,903**	**388,534**	**411,969**	**435,002**	**430,270**	**420,055**	**419,916**	**433,146**	**438,796**	**515,311**	**574,778**	**561,599**	**5,496,279**	**22·4**	**21.5**
N.-W. F. P.	4,195	4,219	3,476	2,726	2,847	3,281	3,280	2,802	2,760	3,687	5,210	5,481	43,964	21	20
Punjab	49,252	40,311	37,617	35,119	42,732	45,219	38,104	35,317	43,038	73,559	84,940	66,884	592,092	28	25
Delhi	397	414	423	599	619	677	462	448	623	1,299	1,542	1,005	8,508	41	26
U. P.	60,493	57,351	62,108	75,231	75,322	69,817	65,263	64,263	60,859	62,033	71,720	68,014	792,474	17	21
B. & O.	64,594	53,933	61,249	71,241	73,991	65,569	61,718	70,988	65,995	73,989	78,647	70,011	811,925	22	21
Bengal	107,008	83,775	85,598	92,576	81,643	78,138	80,708	79,519	78,646	97,473	125,486	134,775	1,125,345	24	21
C. P.	28,943	25,615	30,006	31,096	27,782	25,407	25,625	30,760	34,797	36,956	37,092	33,080	367,159	26	27
Bombay	39,994	32,946	35,077	31,001	28,327	28,071	32,118	36,728	38,576	42,823	44,485	41,950	432,096	24	22
Madras	81,001	67,272	73,053	69,862	72,093	74,846	80,342	82,398	84,089	89,318	89,790	100,156	964,220	24	21
Coorg	330	228	224	250	328	382	348	296	308	292	213	278	3,477	23	22
Assam	13,485	10,700	9,788	11,343	11,828	14,459	14,124	11,540	12,024	14,634	16,570	17,241	157,736	20	19
Burma	16,440	10,940	12,515	13,165	11,891	13,413	17,250	17,477	16,263	18,399	18,269	21,982	188,004	17	16
Ajmer-Merwara	771	830	835	793	867	776	574	610	818	849	814	742	9,279	24	22

TABLE J.—DEATHS BY MONTHS IN URBAN AREAS.

	Jan.	Feb.	March.	April	May.	June	July	Aug.	Sep.	Oct.	Nov.	Dec.	Total	Rate p. m. 1933.	Rate p. m. 1932.
BRITISH INDIA .	51,759	46,571	52,135	50,939	50,709	49,154	45,633	46,635	47,037	51,999	55,088	52,849	600,508	22·2	24·0
N.-W. F. P . .	685	517	454	390	500	526	518	412	422	510	685	620	6,239	19	18
Punjab . . .	5,879	4,797	4,577	5,081	5,571	6,441	5,560	4,812	5,623	6,504	7,487	6,118	68,450	21	22
Delhi . . .	1,221	1,171	1,143	989	935	1,095	708	791	842	1,284	1,337	1,044	12,560	28	23
U. P. . . .	8,248	7,582	9,248	10,877	11,783	12,135	8,390	9,196	8,172	8,672	9,400	8,711	112,414	29	31
B. & O. . .	1,688	1,504	1,775	2,030	1,873	1,800	1,893	1,731	1,732	1,820	1,820	1,806	21,472	15	13
Bengal . . .	6,811	6,463	7,065	6,917	5,868	4,799	5,048	4,976	4,874	6,020	6,745	6,954	72,540	21	18
C. P. . . .	3,484	3,369	4,060	3,731	3,868	2,917	3,250	3,695	4,125	4,444	4,234	3,963	44,640	26	27
Bombay . .	10,485	9,780	10,819	9,103	8,145	7,672	7,913	8,406	8,862	9,329	9,126	8,941	108,581	15	24
Madras . . .	9,150	7,889	8,907	7,880	8,419	7,765	8,312	8,458	8,457	9,303	9,903	10,260	104,703	17	25
Coorg . . .	34	23	18	46	39	38	55	39	44	36	45	37	454	47	43
Assam . . .	260	209	239	246	298	287	283	281	219	347	362	287	3,318	17	17
Burma . . .	3,248	2,808	3,082	2,901	2,919	2,934	3,349	3,436	3,245	3,312	3,396	3,817	38,447	27	29
Ajmer-Merwara .	566	459	548	748	991	745	354	402	420	418	548	491	6,690	37	32

TABLE K.—DEATHS ACCORDING TO AGE.

	Under one year.		1—5 years.		5—10 years.		10—15 years.		15—20 years.	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
BRITISH INDIA . .	892,145	758,828	551,728	531,332	171,311	160,984	95,735	86,440	103,836	127,067
N.-W. F. P. . .	5,471	4,264	4,888	4,554	1,931	1,792	1,160	958	1,098	989
Punjab . . .	107,318	93,437	62,861	60,339	19,501	18,361	14,003	13,529	13,273	13,582
Delhi . . .	3,401	3,095	2,676	2,847	662	602	290	291	287	388
U. P. . . .	143,385	118,395	96,680	85,968	19,341	16,902	12,561	11,243	12,745	13,975
B. & O. . . .	98,881	83,235	87,408	83,262	26,611	22,961	14,833	11,575	14,096	14,844
Bengal . . .	156,254	138,721	84,941	86,685	45,377	43,099	25,399	22,344	25,459	35,236
C. P. . . .	75,227	62,065	44,779	39,091	8,638	7,608	4,737	4,160	5,772	6,966
Bombay . . .	69,270	58,257	53,601	53,697	13,903	14,594	7,731	8,301	7,248	9,465
Madras . . .	170,618	144,668	86,721	87,994	23,736	24,335	8,377	8,233	16,081	22,439
Coorg . . .	443	414	222	233	114	83	67	95	88	102
Assam . . .	21,903	18,328	11,977	11,542	6,297	5,484	3,086	2,527	3,167	4,607
Burma . . .	37,555	31,842	12,834	13,169	4,835	4,884	3,333	2,989	4,330	4,196
Ajmer-Merwara . .	2,419	2,107	2,140	1,951	365	279	158	195	192	278

	20—30 years.		30—40 years.		40—50 years.		50—60 years.		60 years & upwards.	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
BRITISH INDIA . .	218,051	276,744	231,735	218,467	234,473	179,720	232,976	191,164	426,547	407,834
N.-W. F. P. . .	2,106	2,188	2,392	2,330	2,330	2,007	2,392	1,799	3,291	2,260
Punjab . . .	18,815	20,768	19,191	19,513	20,858	18,883	2,580	19,998	44,998	38,734
Delhi . . .	601	860	469	551	471	430	507	405	1,227	1,008
U. P. . . .	31,206	36,842	32,781	30,244	35,063	25,432	36,844	27,394	63,390	54,497
B. & O. . . .	36,059	41,438	37,049	33,999	34,238	27,302	34,268	31,620	47,465	52,253
Bengal . . .	52,862	69,605	54,530	48,567	51,992	38,688	47,027	38,807	69,929	62,363
C. P. . . .	11,345	14,264	12,472	10,994	13,605	9,511	13,346	10,368	28,497	28,354
Bombay . . .	18,366	24,455	20,386	19,402	22,255	15,552	21,753	15,477	44,189	42,775
Madras . . .	29,934	45,235	33,641	35,493	36,072	28,968	38,196	33,056	95,083	106,373
Coorg . . .	237	297	291	214	235	152	183	127	168	166
Assam . . .	6,597	10,269	7,517	7,084	7,363	4,886	6,822	4,633	9,735	7,230
Burma . . .	9,486	9,926	10,566	9,044	9,461	7,490	8,387	7,049	17,577	16,898
Ajmer-Merwara . .	437	597	450	429	530	419	671	481	998	923

TABLE L.—DEATH RATES ACCORDING TO AGE.

	Under 1 year.		1—5 years.		5—10 years.		10—15 years.		15—20 years.	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
BRITISH INDIA . .	177	163	35	33	9	10	6	6	8	10
N.-W. F. P. . .	136	139	31	29	10	12	7	8	10	10
Punjab . . .	195	190	42	42	11	12	9	10	11	13
Delhi . . .	229	223	75	82	16	18	7	9	7	13
U. P. . . .	143	133	32	29	5	6	4	5	5	7
B. & O. . . .	143	127	38	34	10	9	6	6	9	9
Bengal . . .	205	195	28	28	13	14	9	8	11	14
C. P. . . .	213	186	47	39	8	8	5	5	6	9
Bombay . . .	168	153	40	40	9	11	6	7	7	10
Madras . . .	195	174	32	32	8	8	3	3	8	10
Coorg . . .	212	210	29	30	12	9	7	11	10	14
Assam . . .	173	154	54	71	6	19	5	5	4	6
Burma . . .	204	180	19	19	6	6	5	4	7	7
Ajmer-Merwara . .	209	206	64	58	10	9	5	7	6	11

	20—30 years.		30—40 years.		40—50 years.		50—60 years.		60 years & upwards.	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
BRITISH INDIA . .	9	11	12	12	17	15	28	25	76	73
N.-W. F. P. . .	10	10	13	15	21	22	35	34	60	60
Punjab . . .	8	11	11	14	18	20	29	34	65	75
Delhi . . .	7	15	8	15	13	20	28	33	102	118
U. P. . . .	7	9	9	9	13	11	24	20	65	55
B. & O. . . .	11	12	13	12	18	15	31	28	68	61
Bengal . . .	11	15	14	16	21	20	36	35	80	78
C. P. . . .	8	10	11	10	17	13	29	23	89	76
Bombay . . .	9	12	11	13	19	16	34	28	107	105
Madras . . .	8	10	10	11	16	13	27	24	89	90
Coorg . . .	12	20	18	21	25	26	41	37	67	68
Assam . . .	19	26	15	16	13	9	12	8	72	53
Burma . . .	8	9	11	12	16	14	21	19	55	54
Ajmer-Merwara . .	8	12	11	12	17	16	37	28	109	90

TABLE M.—DEATHS ACCORDING TO AGE IN RURAL AREAS.

	Under one year.		1—5 years.		5—10 years.		10—15 years.		15—20 years.	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
BRITISH INDIA	764,686	650,384	490,690	470,416	154,979	144,520	85,537	75,517	91,129	109,814
N.-W. F. P.	4,621	3,566	4,257	3,916	1,796	1,626	1,059	843	993	853
Punjab	95,253	82,935	56,880	54,376	17,715	16,640	12,813	12,177	12,105	12,100
Delhi	1,296	1,205	1,318	1,398	351	274	118	109	91	99
U. P.	121,956	99,991	85,521	74,711	17,315	14,784	11,501	9,624	11,498	11,013
B. & O.	95,816	80,857	85,615	81,549	25,993	22,383	14,484	11,209	13,703	14,220
Bengal	148,361	131,715	81,240	83,258	43,678	41,541	24,156	21,202	23,823	33,508
C. P.	66,765	55,035	40,534	35,308	7,968	6,923	4,343	3,679	5,158	5,849
Bombay	52,685	44,164	43,402	43,464	11,891	12,407	6,593	6,941	5,646	7,136
Madras	154,818	131,497	78,714	79,836	21,738	22,325	7,289	7,051	14,823	20,291
Coorg	481	402	197	208	104	77	54	89	70	92
Assam	21,487	17,985	11,789	11,350	6,226	5,396	3,029	2,481	3,096	4,502
Burma	Not available.		Not available.		Not available.		Not available.		Not available.	
Ajmer-Merwara	1,197	1,032	1,273	1,042	204	144	98	112	128	157

	20—30 years.		30—40 years.		40—50 years.		50—60 years.		60 years & upwards.	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
BRITISH INDIA	184,742	237,526	200,204	190,015	204,327	158,092	204,293	169,883	368,538	353,053
N.-W. F. P.	1,829	1,894	2,143	2,102	2,106	1,854	2,175	1 658	2,781	1,892
Punjab	17,004	18,462	17,425	17,643	18,795	16,972	20,093	17,861	40,235	34,658
Delhi	196	227	149	192	158	165	194	183	455	330
U. P.	28,254	30,963	30,164	27,084	32,207	23,273	33,771	25,346	55,784	47,719
B. & O.	35,105	40,247	36,045	33,231	33,317	26,778	33,395	30,989	46,116	50,873
Bengal	45,592	63,938	50,051	45,202	48,123	36,132	43,837	36,498	65,228	58,262
C. P.	9,982	12,228	11,150	9,809	12,221	8,651	11,942	9,420	25,102	25,092
Bombay	13,706	18,710	15,829	15,746	17,811	12,897	17,585	13,040	36,699	35,744
Madras	26,251	40,193	29,488	31,591	31,869	26,132	33,993	29,910	85,804	90,677
Coorg	181	257	234	190	190	137	152	120	146	146
Assam	6,364	10,063	7,232	6,956	7,145	4,802	6,678	4,549	9,528	7,078
Burma	Not available.		Not available.		Not available.		Not available.		Not available.	
Ajmer-Merwara	278	344	284	269	385	299	478	309	660	682

TABLE N.—DEATHS ACCORDING TO AGE IN URBAN AREAS.

	Under one year.		1—5 years.		5—10 years.		10—15 years.		15—20 years.	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
BRITISH INDIA	79,238	67,651	49,446	49,033	11,884	11,937	7,188	8,224	8,892	13,488
N.-W. F. P.	850	698	631	638	135	166	101	115	105	136
Punjab	12,065	10,502	6,031	5,963	1,786	1,721	1,190	1,352	1,168	1,482
Delhi	2,105	1,890	1,358	1,449	311	328	172	182	196	289
U. P.	21,429	18,404	11,159	11,257	2,026	2,118	1,060	1,619	1,252	2,962
B. & O.	3,065	2,378	1,793	1,713	618	578	349	366	393	624
Bengal	7,893	7,006	3,701	3,427	1,699	1,558	1,243	1,142	1,636	1,728
C. P.	8,462	7,030	4,245	3,783	670	685	394	481	614	1,117
Bombay	16,585	14,093	10,199	10,233	2,012	2,187	1,138	1,360	1,602	2,329
Madras	15,800	13,171	8,007	8,158	1,998	2,010	1,088	1,182	1,258	2,148
Coorg	12	12	25	25	10	6	13	6	18	10
Assam	416	343	188	192	71	88	57	46	71	105
Burma	5,134	4,220	1,242	1,286	387	357	323	290	515	431
Ajmer-Merwara	1,222	1,075	867	909	161	135	60	83	64	127

	20—30 years.		30—40 years.		40—50 years.		50—60 years.		60 years & upwards.	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
BRITISH INDIA	25,683	30,531	23,191	19,990	22,503	15,057	21,764	14,971	42,738	39,918
N.-W. F. P.	277	294	249	231	224	153	217	141	510	368
Punjab	1,811	2,306	1,766	1,870	2,063	1,911	2,487	2,137	4,763	4,076
Delhi	405	633	320	359	313	265	313	222	772	678
U. P.	2,952	5,879	2,617	3,160	2,856	2,159	3,073	2,048	7,606	6,778
B. & O.	954	1,191	1,004	768	921	524	873	631	1,349	1,380
Bengal	7,270	5,667	4,479	3,365	3,869	2,556	3,190	2,309	4,701	4,101
C. P.	1,363	2,036	1,322	1,185	1,384	860	1,404	948	3,395	3,262
Bombay	4,660	5,745	4,557	3,656	4,444	2,655	4,168	2,437	7,490	7,031
Madras	3,683	5,042	4,153	3,902	4,203	2,836	4,203	3,146	9,279	9,696
Coorg	56	40	57	24	45	15	31	7	22	20
Assam	233	206	285	128	218	84	144	84	207	152
Burma	1,860	1,239	2,226	1,182	1,818	919	1,468	739	2,306	2,035
Ajmer-Merwara	159	253	156	160	145	120	193	122	338	341

TABLE O.—INFANTILE MORTALITY RATE OF 200 AND OVER PER 1,000 LIVE-BIRTHS IN TOWNS.

Towns.	Rates.
N.-W. F. Province.	
Haripur	379
Mardan	208
Peshawar	203
Tank Notified Area	201
Delhi.	
Delhi City	233
United Provinces.	
Etawah	355
Sahaswan	316
Saharanpur	308
Sikandra Rao	295
Shikarpur	292
Sikandrabad	291
Hathras	288
Hardwar Union	282
Atrauli	280
Bulandshahr	271
Muttra	269
Soron	265
Hasanpur	264
Lucknow	264
Farrukhabad	263
Hapur	261
Budaun	259
Tilhar	259
Rae Bareli	259
Sandila	258
Firozabad	257
Etah	255
Khurja	251
Roorkee	247
Jalesar	245
Mau (Jhansi)	245
Lalitpur	242
Jhansi	239
Dhampur	237
Garhia Phatak	236
Fatehpur	235
Ujhani	233
Rudauli	232
Aligarh	230
Kashipur	230
Rath	229
Bisalpur	228
Cawnpore	224
Benares	224

Towns.	Rates.
United Provinces—contd.	
Unao	224
Ghaziabad	224
Agra	221
Gorakhpur	220
Sitapur	217
Muzaffarnagar	215
Pilibhit	215
Aonla	214
Moradabad	214
Chandausi	214
Kairana	213
Allahabad	212
Tanda	211
Sambhal	210
Debai	209
Deoband	201
Bengal Presidency.	
Kalna	413
Gobardanga	292
Rajbari	292
Chandrakona	283
North Dum Dum	278
Calcutta	274
Nabadwip	272
Howrah	259
Bansberia	243
Jhalakati	237
Old Malda	232
Barisal	229
Baruipur	228
Mymensingh	225
Dacca	218
Chittagong	214
Kharar	213
Sonamukhi	212
Gauripur	210
Narayanganj	207
Khulna	203
Birnagar	200
Central Provinces.	
Jubbulpore Cantt.	299
Kalmeshwar	290
Pusla	285
Sausar	272
Bamora	270
Jalgaon	269

TABLE O.—INFANTILE MORTALITY RATE OF 200 AND OVER PER 1,000 LIVE-BIRTHS IN TOWNS—*contd.*

Towns,	Rates.
Central Provinces—contd.	
Umrer	260
Chhindwara	250
Nagpur	248
Warora	248
Nandgaonpeth	244
Digras	239
Shegaon	238
Jarud	238
Mowar	237
Gadarwara	237
Raipur	237
Seoni	236
Harda	236
Pusad	235
Seoni-Malwa	234
Khamgaon	234
Saugor	233
Chandur Railway	232
Umerkhed	232
Basim	232
Pandhurna	231
Hinganghat	230
Itarsi	230
Murtizapur	226
Akola	225
Tumsar	224
Pauni	223
Naerkhed	221
Bhatapara	215
Chhota Chhindwara	213
Akot	212
Bilaspur	209
Daryapur	209
Gondia	208
Drug	207
Damoh	206
Sendurjana	204
Hoshangabad	202
Wardha	200
Bombay Presidency.	
Yeola	432
Barsi	389
Garhi Yasin	362
Poona	361
Pandharpur	355
Nasik	347

Towns.	Rates.
Bombay Presidency—contd.	
Nawabshah	345
Viramgaon	340
Satara	316
Ilkal	306
Surat	294
Ahmedabad	275
Bombay City	270
Nadiad	264
Dakore	251
Poona Suburban	242
Ahmedabad Cantt.	237
Lonavla	237
Sholapur	230
Ratodero	230
Matiari	22
Larkana	219
Thana	217
Hyderabad	216
Ankleshwar	215
Belgaum Cantt.	214
Shikarpur	213
Madras Presidency.	
Vizagapatam	288
Sivakasi	278
Madras	270
Palghat	268
Rajahmundry	264
Madura	256
Tinnevelly	252
Tirupati	239
Bezwada	237
Nellore	235
Masulipatam	231
Palamcottah	230
Narasaraopet	227
Saidapet	222
Vizianagram	222
Bellary	221
Ongole	214
Karur	214
Tiruppur	212
Palni	212
Tanjore	210
Coimbatore	203
Cocanada	202
Hospet	201

TABLE O.—INFANTILE DEATH RATES OF 200 AND OVER PER 1,000 LIVE-BIRTHS IN TOWNS—*concld.*

Towns.	Rates.
Madras Presidency—contd.	
Negapatam	201
Periyakulam	201
Cuddalore	200
Burma.	
Taungdwingyi	473
Salin	456
Kawkareik	431
Pakokku	406
Myingyan	395
Pyawbwe	389
Thayetmyo	382
Yenangyaung	373
Gyobingauk	366
Chauk	364
Kamayut	342
Moulmeingyun	338
Kyaukse	330
Monywa	328
Magwe	326
Shwebo	322
Wakema	220
Maubin	308
Myinmu	308
Minbu	295
Sagaing	293
Kyaiklat	291
Myanaung	290
Yamethin	289

Towns.	Rates.
Burma—contd.	
Kanbe	289
Henzada	286
Bassien	283
Paungde	282
Insein	277
Nyaung-u	275
Mandalay	274
Prome	272
Akyab	272
Nyaunglebin	268
Pyinmana	267
Allanmyo	267
Ye-u	267
Rangoon	257
Myaungmya	250
Thamaing	250
Ngathainggyaung	247
Myitnge	242
Yandoon	242
Thingangyun	241
Pyu	236
Pyapon	236
Meiktila	235
Letpadan	230
Kyangin	230
Pegu	226
Danubyu	220
Minbya	213
Zigon	207

Appendix II

relating to

Section II.

TABLE A.—DEATHS FROM CHOLERA FROM 1902 TO 1933.

Year.	British India.	N.-W. F. P.	Punjab.	Delhi.	U. P.	B. & O.	Bengal.	C. P.	Bombay.	Madras.	Coorg.	Assam.	Burma.	Ajmer-Merwara.	Indian States. Raj-putana.	Central India.	Hydera-bad.	Mysore.
1902	224,136	...	367	4	25,160	60,174	90,797	44	3,230	29,769	...	12,658	1,901	32	1,519	12	...	218
1903	312,854	1,354	14,366	322	47,159	109,560	93,845	437	1,825	27,393	...	8,360	8,233	...	236	1,110	...	99
1904	192,835	1	714	2	6,617	35,241	102,460	2,967	13,156	23,109	...	5,588	2,980	...	1	150	...	471
1905	441,786	300	2,197	...	121,790	93,590	172,178	1,217	5,396	16,888	...	22,883	2,347	...	8	27	64	628
1906	690,521	...	4,107	127	149,549	131,571	135,621	38,768	46,119	142,811	10	33,682	7,872	284	4,714	10,147	1,061	7,222
1907	408,102	266	429	8	22,438	115,801	158,190	4,291	7,656	81,565	187	8,892	7,678	1	64	41	1	4,972
1908	591,725	2,845	12,120	177	83,544	182,377	123,471	9,048	1,759	141,970	114	22,389	11,911	...	737	1,730	937	2,149
1909	239,231	134	1,501	12	21,823	32,011	88,356	7,687	28,714	39,424	99	8,081	11,389	...	403	1,421	164	1,629
1910	430,451	1,605	2,130	1	102,402	126,382	119,686	5,316	3,694	32,594	56	34,512	2,011	2	8	2,864	2	1,812
1911	354,005	12	1,218	47	117,689	88,583	67,750	2,998	5,817	58,174	6	7,475	4,191	50	85	1,054	803	210
1912	407,769	1,329	1,833	406	18,894	77,023	95,467	34,313	64,505	92,497	...	14,303	7,186	13	414	9,080	1,190	6,748
1913	294,815	175	5,811	37	60,427	70,379	78,898	15,286	5,134	37,730	192	16,407	4,339	...	4,085	2,823	1,322	8,062
1914	280,730	2,300	6,656	12	32,498	32,115	89,224	20,345	17,779	68,449	...	9,270	2,073	9	1,627	10,075	5,893	840
1915	404,472	932	13,196	92	90,508	88,349	130,679	5,662	377	30,093	...	26,979	17,687	3	1,981	795	2,072	178
1916	288,047	194	1,651	69	33,300	90,582	70,836	39,205	19,841	16,735	1	13,099	1,773	861	5,075	5,474	1,475	137
1917	267,002	...	1,365	12	21,440	109,620	45,021	691	17,003	58,939	32	10,953	1,914	12	69	589	2,579	7,288
1918	560,802	31	257	3	119,746	205,584	82,379	3,351	8,834	122,263	1	14,077	4,269	7	3	485	7,200	3,153
1919	578,426	4,400	8,561	66	81,365	104,727	124,949	62,089	51,551	98,262	157	33,080	13,260	59	842	8,309	13,321	2,306
1920	130,140	2	138	7	6,952	26,341	54,199	3,491	2,047	31,139	6	2,421	3,396	1	508	278	57	220
1921	450,608	4,285	19,215	635	149,667	90,688	89,547	58,331	3,521	27,064	...	12,829	3,791	35	2,750	5,079	1,381	25
1922	121,679	92	128	6	2,330	26,805	51,712	64	2,768	16,502	4	16,219	5,047	2	...	...	3,288	46
1923	73,002	2	11	12	2,591	8,198	41,483	1,090	9,221	5,169	...	3,728	1,488	9	9	62	1,174	79
1924	293,707	9	3,351	121	67,000	77,480	48,514	9,704	8,236	51,971	24	19,182	8,083	32	644	1,407	3,354	7,699
1925	115,645	116	3,049	50	7,653	17,336	34,276	124	57	44,815	4	6,233	1,932	...	...	43	22	...
1926	138,151	...	87	18	6,166	27,268	59,106	4,565	78	24,407	2	10,275	6,182	2	4	269	26	6
1927	304,710	2	11,286	16	28,285	49,022	118,377	16,311	26,153	35,334	...	15,392	4,528	4	1,357	2,584	8,913	1,367
1928	351,305	...	2,034	34	44,941	77,103	136,245	12,198	6,881	57,677	...	6,915	7,209	68	1,371	7,520	4,314	413
1929	295,434	30	2,309	193	50,924	104,034	81,090	6,168	9,084	25,846	1	7,765	7,970	20	722	1,155	450	140
1930	337,322	449	1,181	8	61,334	155,215	54,963	23,250	15,142	18,746	...	6,332	661	41	2,101	11,165	18,369	535
1931	220,909	105	391	61	31,118	40,943	79,073	14,135	18,646	30,232	116	5,523	534	32	294	1,411	5,653	6,385
1932	67,291	70	614	4	9,734	9,348	33,910	854	1,353	5,278	...	4,971	1,082	1	122	168	71	83
1933	68,318	...	160	...	1,915	17,514	29,242	2,152	7,797	3,851	...	5,508	179	...	35	642	4,888	90

Table B.—Deaths from cholera in rural and urban areas.

	Deaths.			Rate p.m.			Mean 1928-32.	Total Villages.	Number Infected.
	R.	U.	Total.	R.	U.	Total.			
British India	**64,061**	**4,257**	**68,318**	**0·3**	**0·2**	**0·3**	**1·0**	**464,278**	**17,280**
N.-W. F. P.	...	...	...	...	...	...	...	2,802	...
Punjab	115	45	160	...	...	...	...	34,520	70
Delhi	...	...	...	...	...	...	0·1	304	...
U. P.	1,817	98	1,915	...	...	...	0·9	105,640	457
B. & O	17,019	495	17,514	0·5	0·4	0·5	2·0	83,402	3,346
Bengal	26,974	2,268	29,242	0·6	0·6	0·6	1·5	86,360	8,074
C. P.	1,938	214	2,152	0·1	0·1	0·1	0·8	39,874	543
Bombay	7,312	485	7,797	0·4	0·1	0·4	0·5	30,550	1,615
Madras	3,285	566	3,851	0·1	0·1	0·1	0·6	39,887	1,201
Coorg	...	...	...	...	...	...	0·1	298	...
Assam	5,477	31	5,508	0·7	0·2	0·7	0·8	28,333	1,903
Burma	124	55	179	...	...	...	0·3	11,569	71
Ajmer-Merwara	...	...	...	...	...	...	...	739	...

Table C.—Deaths from Cholera by months.

	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total. 1933.	Total. 1932.	Rate p.m. 1933.	Rate p.m. 1932.
British India	**3,353**	**2,785**	**7,615**	**10,834**	**5,947**	**2,623**	**3,027**	**4,733**	**5,493**	**7,625**	**7,805**	**6,478**	**68,318**	**67,219**	**0·3**	**0·2**
N.-W. F. P.	...	...	...	...	...	...	...	...	...	...	...	...	...	70	...	...
Punjab	...	...	4	4	10	27	26	13	20	37	16	3	160	614	...	...
Delhi	...	...	...	...	...	...	...	...	...	...	...	...	...	4	...	...
U. P.	12	10	122	1,059	354	120	96	76	17	33	16	...	1,915	9,734	...	0·2
B. & O.	693	416	437	691	436	203	367	1,953	2,703	4,397	3,768	1,450	17,514	9,348	0·5	0·2
Bengal	2,424	2,255	6,609	8,287	4,331	1,439	658	373	306	331	673	1,556	29,242	33,910	0·6	0·7
C. P.	1	2	43	158	66	14	27	380	869	415	109	68	2,152	854	0·1	...
Bombay	173	30	307	472	432	566	1,518	1,413	943	924	621	398	7,797	1,353	0·4	...
Madras	21	21	21	7	12	18	213	474	471	523	604	1,466	3,851	5,278	0·1	0·1
Coorg	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Assam	28	51	63	145	268	201	69	35	155	964	1,992	1,537	5,508	4,971	0.7	0·6
Burma	1	...	9	11	38	35	53	16	9	1	6	...	179	1,082	...	0·1
Ajmer-Merwara	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...

TABLE D.—DEATHS FROM PLAGUE BY MONTHS.

(i). British Provinces.

		Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total. 1933.	Total. 1932.	Rate p.m. 1933.	Rate p.m. 1932.
GRAND TOTAL	1932	7,431	9,673	11,058	6,924	2,608	1,006	1,769	3,307	4,130	4,566	4,968	6,250	...	63,690	...	...
	1933	**6,491**	**5,836**	**5,741**	**3,608**	**2,777**	**1,682**	**3,642**	**6,712**	**7,717**	**8,343**	**7,752**	**9,891**	**70,192**	...	...	...
BRITISH INDIA	1932	5,676	8,211	9,743	6,236	2,223	629	818	1,610	2,296	2,681	2,906	3,475	...	46,504	...	0·2
	1933	**3,644**	**3,455**	**3,993**	**2,800**	**2,276**	**845**	**1,649**	**3,513**	**4,351**	**4,841**	**4,845**	**6,419**	**42,631**	...	**0·2**	...
N.-W. F. P.		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Punjab		43	18	73	400	735	115	12	...	11	24	94	264	**1,789**	2,003	**0·1**	**0·1**
Delhi		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
U. P.		551	1,146	1,741	1,647	1,209	213	46	59	55	176	606	2,386	**9,835**	21,497	**0·2**	**0·4**
B. & O.		232	315	512	147	28	5	6	1	22	13	99	255	**1,635**	3,374	...	**0·1**
Bengal		...	...	...	...	...	...	...	...	...	...	...	1	**1**	1	...	...
C. P.		42	79	80	18	10	5	17	47	155	250	275	222	**1,200**	2,058	**0·1**	**0·1**
Bombay		2,413	1,600	1,326	495	248	436	1,381	2,867	3,624	4,009	3,431	2,730	**24,560**	14,446	**1·1**	**0·7**
Madras		247	164	133	22	26	49	118	478	421	309	276	348	**2,591**	1,561	**0·1**	...
Coorg		4	4	3	11	6	4	8	3	2	...	...	3	**48**	8	**0·3**	...
Assam		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Burma		112	129	125	60	14	18	61	58	61	60	64	210	**972**	1,556	**0·1**	**0·1**
Ajmer-Merwara		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...

(ii). Indian States and Agencies.

TOTAL	1932	1,755	1,462	1,315	688	385	377	951	1,697	1,834	1,885	2,062	2,775	...	17,186		
	1933	**2,847**	**2,381**	**1,748**	**808**	**501**	**837**	**1,993**	**3,199**	**3,366**	**3,502**	**2,907**	**3,472**	**27,561**	...		
Punjab		...	...	9*	4*	2*	...	...	...	...	...	...	...	15	...		
U. P.		...	10	1	13	8	2	31	7	...	...	...	...	72	645		
B. & O.		...	...	...	...	...	...	...	...	...	...	...	...	...	...		
Bengal		...	...	...	...	...	...	...	...	...	...	...	...	...	...		
C. P.		...	...	...	...	...	...	...	...	...	...	...	...	...	...		
Bombay		879	699	714	219	76	154	419	588	1,154	825	690	577	**7,012**	5,919		
Madras		...	...	...	...	...	...	...	...	...	...	...	...	...	11		
Mysore		720	391	248	142	77	393	551	852	782	655	625	419	**5,855**	7,232		
Bangalore C.&M. Station		4	7	...	2	...	6	7	21	33	21	11	11	**123**	101		
Hyderabad		1,172	1,182	638	270	192	243	974	1,686	1,356	1,912	1,497	2,365	**13,487**	2,809		
C. I. Agency		...	2	...	...	...	...	...	...	1	37	8	2	50	5		
Baroda		39	45	91	28	...	...	...	37	2	35	43	40	**360**	150		
Rajputana		...	...	...	...	...	...	...	...	...	...	...	...	...	...		
Assam		...	...	...	...	...	...	...	...	...	...	...	...	...	...		
Burma		...	...	...	...	...	3	9	8	33	5	...	4	62	19		
Jammu & Kashmir		15	45	47	130	146	36	2	...	5	12	33	54	**525**	295		
Baluchistan		...	...	...	...	...	...	...	...	...	...	...	...	...	...		

* Occurred in Kapurthala State. Other states remained free.

TABLE E.—DEATHS FROM SMALLPOX IN RURAL AND URBAN AREAS.

	Deaths.			Death rate p. m.			Mean. 1928-32.	Deaths in children.			Percentage of deaths to total mortality.		
	R.	U.	Total.	R.	U.	Total.		Under 1 year.	1—10 years.	Total.	Under 1 year.	1—10 years.	Total.
BRITISH INDIA	**32,104**	**21,537**	**103,641**	**0·3**	**0·8**	**0·4**	**0·3**	**16,936**	**27,390**	**44,326**	**16**	**26**	**43**
N.-W. F. P.	1,283	249	1,532	0·6	0·8	0·7	0·1	421	831	1,252	28	54	82
Punjab	9,980	1,646	11,626	0·5	0·5	0·5	0·3	3,534	5,332	8,866	30	46	76
Delhi	85	863	948	0·4	1·9	1·4	0·6	298	557	855	31	59	90
U. P.	7,450	2,394	9,844	0·2	0·6	0·2	0·1	2,016	4,072	6,088	21	41	62
B. & O	40,232	2,442	42,674	1·1	1·7	1·1	0·3	4,579	8,528	13,107	11	20	31
Bengal	9,928	5,498	15,426	0·2	1·6	0·3	0·4	808	915	1,723	5	6	11
C. P.	446	115	561	...	0·1	...	0·2	220	337	557	39	60	99
Bombay	3,807	3,934	7,741	0·2	0·9	0·4	0·4	1,807	3,306	5,113	23	43	66
Madras	7,206	3,539	10,745	0·2	0·6	0·2	0·2	3,081	3,009	6,090	29	28	57
Coorg	14	...	14	0·1	...	0·1	0·1	1	2	3	7	14	22
Assam	234	13	247	...	0·1	...	0·3	24	31	55	10	13	22
Burma	1,116	390	1,506	0·1	0·3	0·1	0·1	147	470	617	10	31	41
Ajmer-Merwara	323	454	777	0·8	2·5	1·4	0·8		Not available.		...	...	...

TABLE F.—DEATHS FROM SMALLPOX BY MONTHS.

	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.	Rate p. m. 1933.	Rate p. m. 1932.
BRITISH INDIA	**8,059**	**10,910**	**13,179**	**17,390**	**18,614**	**12,654**	**7,218**	**3,928**	**2,485**	**2,213**	**2,469**	**4,522**	**103,641**	**0·4**	**0·8**
N.-W. F. P.	213	163	116	117	153	245	172	65	62	14	78	134	1,532	0·7	0·2
Punjab	1,806	1,648	1,733	1,625	1,757	1,438	866	329	142	66	72	144	11,626	0·5	0·6
Delhi	284	305	207	88	46	11	6	...	1	...	...	...	948	1·4	0·8
U. P.	422	687	1,011	1,787	2,268	1,614	737	295	113	91	208	611	9,844	0·2	0·3
B. & O.	2,641	3,631	4,424	7,809	9,447	6,036	2,825	1,499	887	732	918	1,825	42,674	1·1	0·4
Bengal	1,042	1,939	2,469	2,885	2,520	1,678	1,081	541	317	300	201	453	15,426	0·3	0·8
C. P.	18	49	48	58	99	77	28	23	63	17	41	40	561	...	1·5
Bombay	790	1,437	1,584	1,305	793	488	350	232	137	144	138	343	7,741	0·4	1·0
Madras	693	861	1,234	1,196	980	744	995	850	687	815	776	914	10,745	0·2	1·7
Coorg	...	3	...	6	1	1	3	...	...	...	...	..	14	0·1	0·7
Assam	27	24	20	20	38	30	23	22	19	7	10	7	247	...	1·3
Burma	111	123	258	279	254	194	99	60	43	23	26	36	1,506	0·1	0·4
Ajmer-Merwara	12	40	75	215	258	98	33	12	14	4	1	15	777	1·4	0·5

Table G.—Deaths from Fevers and Malaria.

	Fever deaths.			Death rate p. m.			Mean 1928-32.	Malaria deaths			Death rate p. m.		
	R.	U.	Total.	R.	U.	Total.		R.	U.	Total.	R.	U.	Total.
British India	3,349,586	180,713	3,530,299	14	7	13	15	1,050,182	24,354	1,074,536	...	...	...
N.-W. F. P.	37,552	3,018	40,570	18	9	17	16	...	...	...	...	...	...
Punjab	429,937	30,794	460,731	20	10	19	17	...	...	...	...	...	...
Delhi	6,197	4,841	11,038	30	11	17	15	4	68	72	...	0·1	0·1
U. P.	653,515	44,658	698,173	14	12	14	19	609,166	16,528	625,694	13·3	4·3	12·6
B. & O.	565,198	9,350	574,548	15	7	15	17	...	...	...	...	...	...
Bengal	797,051	15,342	812,393	17	4	16	14	410,690	3,232	413,922	8·7	0·9	8·2
C. P.	214,621	17,230	231,851	15	10	15	19	...	...	...	...	...	...
Bombay	173,785	22,742	196,527	10	5	9	11	27,590	2,784	30,374	1·5	0·7	1·4
Madras	275,483	24,699	300,182	7	4	6	8	...	...	...	...	...	...
Coorg	2,976	82	3,058	19	9	19	20	2,732	38	2,770	17·7	4·0	17·0
Assam	102,910	980	103,890	13	5	13	11	...	...	...	...	...	...
Burma	81,643	4,173	85,816	8	8	7	7	...	1,704	1,704	...	1·2	...
Ajmer-Merwara	8,718	2,804	11,522	22	15	20	20	...	...	...	...	...	...

Table H.—Deaths from Fevers by Months.

	Jan.	Feb.	Mar.	Apl.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.	Rate p. m. 1933.	Rate p. m. 1932.
British India	294,198	243,668	258,129	282,030	280,159	278,383	267,192	269,941	269,833	331,772	389,242	365,772	3,530,299	13	13
N.-W. F. P.	3,848	3,746	3,104	2,419	2,543	2,937	3,001	2,517	2,546	3,581	5,094	5,234	40,570	17	16
Punjab	34,133	27,545	25,896	24,891	31,148	35,702	29,564	26,230	33,422	62,340	74,672	55,188	460,731	19	16
Delhi	552	525	580	761	733	975	533	633	818	1,714	1,993	1,221	11,038	17	11
U. P.	54,236	50,990	55,597	67,082	68,261	64,607	57,333	55,107	51,018	52,872	63,040	58,030	698,173	14	18
B. & O.	45,141	36,514	42,884	50,113	50,183	46,366	43,501	50,339	46,113	52,614	58,487	52,293	574,548	15	15
Bengal	75,918	58,046	55,762	61,679	56,470	57,002	60,574	60,540	58,178	72,376	95,560	100,288	812,393	16	14
C. P.	18,155	16,421	19,900	21,412	19,101	17,240	15,790	18,154	20,109	22,614	22,504	20,451	231,851	15	15
Bombay	19,343	16,583	18,116	15,883	14,156	12,637	13,149	14,418	15,296	17,904	20,408	18,634	196,527	9	9
Madras	24,922	20,300	22,898	22,475	22,867	23,173	24,686	25,328	26,407	27,797	28,493	31,336	300,182	6	6
Coorg	282	178	175	223	283	346	312	261	274	279	205	240	3,058	19	18
Assam	8,623	6,793	6,301	7,840	8,257	10,879	10,593	8,197	7,377	8,945	9,375	10,210	103,890	13	12
Burma	3,003	5,019	5,885	6,220	5,404	5,460	7,553	7,525	6,835	7,742	8,412	11,758	85,816	7	6
Ajmer-Merwara	1,042	1,008	1,031	1,032	1,253	1,059	603	692	940	994	989	879	11,522	20	19

TABLE I.—DEATHS FROM DYSENTERY AND DIARRHŒA IN RURAL AND URBAN AREAS.

	Deaths.			Death rate p. m.			Mean 1928-32.	Deaths from dysentery.			Deaths rate p. m.		
	R.	U.	Total.	R.	U.	Total.		R.	U.	Total.	R.	U.	Total.
British India	**199,161**	**47,003**	**246,164**	**0·8**	**1·7**	**0·9**	**0·9**	...	...	...	...	...	...
N.-W. F. P.	102	187	289	...	0·6	0·1	0·1	...	...	...	...	...	...
Punjab	8,597	3,748	12,345	0·4	1·2	0·5	0·5	...	846*	...	...	...	...
Delhi	117	499	616	0·6	1·1	0·9	0·9	90	128	218	0·4	0·3	0·3
U. P.	4,374	7,127	11,501	0·1	1·9	0·2	0·3	2,891	2,105	4,996	0·1	0·7	0·1
B. & O.	16,019	1,045	17,064	0·4	0·7	0·4	0·5	...	...	...	...	...	...
Bengal	40,031	6,666	46,697	0·8	1·9	0·9	0·8	25,980	3,719	29,699	0·5	1·0	0·6
C. P.	19,556	2,676	22,232	1·4	1·6	1·4	2·2	3,039	3,401	6,440	0·2	2·0	0·4
Bombay	18,058	5,104	23,162	1·0	1·2	1·0	1·2	1,772	1,076	2,848	0·1	0·2	0·1
Madras	80,241	17,343	97,584	2·0	2·8	2·1	1·8	...	...	...	...	...	...
Coorg	77	45	122	0·5	4·7	0·7	0·8	48	18	66	0·3	2·0	0·4
Assam	8,930	337	9,267	1·1	1·7	1·1	1·1	...	238†	...	...	...	...
Burma	3,052	1,850	4,902	0·3	1·3	0·4	0·6	...	840	...	...	0·6	...
Ajmer-Merwara	7	376	383	...	2·1	0·7	0·4	...	...	...	...	...	...

* For 13 municipal towns in charge of whole-time health officers.

† In 13 larger towns.

TABLE J.—DEATHS FROM DYSENTERY AND DIARRHŒA BY MONTHS.

	Jan.	Feb.	Mar.	Apl.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.	Rate p. m. 1933.	Rate p. m. 1932.
British India	**18,677**	**15,093**	**17,273**	**18,084**	**19,126**	**20,680**	**22,084**	**22,567**	**22,821**	**24,361**	**22,740**	**22,658**	**246,164**	**0·9**	**0·8**
N.-W. F. P.	20	20	21	26	32	21	29	27	21	23	25	24	289	0·1	0·2
Punjab	847	658	725	869	1,124	1,105	915	1,013	1,216	1,258	1,241	1,374	12,345	0·5	0·6
Delhi	12	26	37	67	60	77	37	57	47	71	69	56	616	0·9	0·8
U. P.	544	396	610	1,120	1,379	1,627	1,134	1,154	924	915	925	773	11,501	0·2	0·3
B. & O.	1,473	1,170	1,299	1,249	1,321	1,109	1,387	1,699	1,476	1,785	1,627	1,469	17,064	0·4	0·4
Bengal	4,263	3,540	3,875	4,164	3,895	3,669	3,620	3,190	3,339	3,946	4,359	4,837	46,697	0·9	0·8
C. P.	1,309	1,196	1,578	1,494	1,328	1,217	1,826	2,389	3,083	2,897	2,165	1,750	22,232	1·4	1·5
Bombay	1,340	1,099	1,304	1,324	1,429	1,887	2,529	2,916	2,708	2,636	2,087	1,903	23,162	1·0	1·0
Madras	7,970	6,356	7,041	6,683	7,360	8,484	8,916	8,650	8,696	9,300	8,902	9,226	97,584	2·1	1·7
Coorg	10	6	8	8	14	22	13	14	11	4	8	4	122	0·7	0·7
Assam	598	413	489	704	791	896	877	743	847	1,055	971	883	9,267	1·1	1·3
Burma	268	203	270	332	326	505	772	677	421	448	337	343	4,902	0·4	0·4
Ajmer-Merwara.	23	10	16	44	67	61	29	38	32	23	24	16	383	0·7	0·5

TABLE K.—DEATHS FROM RESPIRATORY DISEASES IN RURAL AND URBAN AREAS.

	Deaths.			Death rate p.m.			Mean 1928-32.	Deaths from pulmonary tuberculosis.			Death rate p.m.		
	R.	U.	Total.	R.	U.	Total.		R.	U.	Total.	R.	U.	Total.
British India	**307,516**	**135,789**	**443,305**	**1·2**	**5·1**	**1·6**	**1·6**	...	...	...	...	...	...
N.-W. F. P.	1,466	1,288	2,754	0·7	4·0	1·1	1·0		...	...	...	...	...
Punjab	42,032	13,305	55,337	2·0	4·1	2·3	2·3	...	...	...	...	...	...
Delhi	1,349	3,114	4,463	6·5	6·9	6·8	7·8	66	515	581	0·3	1·1	0·9
U. P.	8,212	26,686	34,898	0·2	6·9	0·7	0·7	562	4,883	5,445	...	1·3	0·1
B. & O.	5,365	930	6,295	0·1	0·7	0·2	0·2	...	...	...	...	...	...
Bengal	64,657	17,516	82,173	1·4	5·0	1·6	1·1	11,130	3,672	14,802	0·2	1·0	0·3
C. P.	26,998	5,136	32,134	1·9	3·0	2·0	2·6	1,733	589	2,322	0·1	0·3	0·1
Bombay	67,739	32,461	100,200	3·7	7·6	4·5	4·8	15,422	7,101	22,523	0·8	1·7	1·0
Madras	81,043	24,785	105,828	2·0	4·0	2·3	2·1	...	...	...	...	...	...
Coorg	47	132	179	0·3	13·7	1·1	1·7	3	2	5	...	0·2	...
Assam	5,032	412	5,444	0·6	2·1	0·1	0·7	...	90	...	...	...	...
Burma	3,558	8,485	12,043	0·3	6·0	1·0	1·0	...	2,259	...	...	1·6	...
Ajmer-Merwara	18	1,539	1,557	...	8·6	2·7	1·0	...	...	...	...	...	...

TABLE L.—DEATHS FROM RESPIRATORY DISEASES BY MONTHS.

	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.	Rate p.m. 1933.	Rate p.m. 1932.
British India	**44,563**	**38,993**	**40,486**	**35,523**	**33,732**	**30,50**	**30,605**	**31,710**	**33,719**	**36,928**	**41,696**	**44,847**	**443,305**	**1·6**	**1·5**
N.-W. F. P.	377	395	263	190	201	191	152	146	157	161	237	284	2,754	1·1	1·3
Punjab	8,320	6,516	5,497	4,405	4,596	3,541	3,068	2,707	3,396	3,337	4,557	5,397	55,337	2·3	2·5
Delhi	441	480	402	354	322	368	322	259	266	351	449	449	4,463	6·8	6·2
U. P.	3,417	3,107	3,198	3,099	3,035	2,621	2,105	2,458	2,338	2,786	3,318	3,416	34,898	0·7	0·7
B. & O.	584	529	592	565	585	467	514	499	399	507	518	536	6,295	0·2	0·1
Bengal	7,565	6,696	7,642	7,263	6,277	5,528	5,707	5,385	5,665	6,595	8,143	9,707	82,173	1·6	1·2
C. P.	3,009	2,933	3,180	2,815	2,300	1,822	1,892	2,299	2,490	2,821	3,477	3,096	32,134	2·0	2·0
Bombay	10,087	8,874	9,301	7,450	6,837	6,465	6,790	7,555	8,386	9,269	9,528	9,658	100,200	4·5	4·2
Madras	9,138	8,033	8,844	7,836	8,166	8,062	8,585	8,760	8,947	9,386	9,737	10,334	105,828	2·3	2·0
Coorg	18	13	...	18	21	13	18	20	14	14	15	15	179	1·1	1·6
Assam	513	448	447	479	424	375	365	373	464	513	467	576	5,444	0·1	0·7
Burma	946	830	976	921	835	946	1,009	1,132	1,095	1,081	1,077	1,195	12,043	1·0	1·0
Ajmer-Merwara	148	139	144	128	133	104	78	117	102	107	173	184	1,557	2·7	2·3

TABLE M.—QUININE AND CINCHONA FEBRIFUGE ISSUED BY THE PUBLIC HEALTH, MEDICAL, AND OTHER DEPARTMENTS IN THE VARIOUS PROVINCES DURING 1933.

Districts.	Quinine.		Cinchona febrifuge.	
	Total issues in lbs.	Grains per head of population.	Total issues in lbs.	Grains per head of population.
N.-W. F. P.				
Peshawar	508	4	667	5
Hazara	95	1	122	1
D. I. Khan	148	4	119	3
Kohat	89	3	60	2
Bannu	75	2	100	3
Total	915	3	1,068	3
PUNJAB.				
Hissar	61	1	16	..
Rohtak	174	2	420	4
Gurgaon	84	1	154	2
Karnal	194	2	13	..
Ambala	102	1	91	1
Simla	..	..	..	..
Kangra	167	2	..	..
Hoshiarpur	158	1	..	..
Jullundur	90	1	2	..
Ludhiana	118	1	..	..
Ferozepore	180	1	1	..
Lahore	235	1	3	..
Amritsar	151	1	47	..
Gurdaspur	187	1	44	..
Sialkot	148	1	1	..
Gujranwala	162	2	..	..
Sheikhupura	68	1	19	..
Gujrat	81	1	15	..
Shahpur	156	1	7	..
Jhelum	62	1	6	..
Rawalpindi	100	1	2	..
Attock	101	1	6	..
Mianwali	77	1	4	..
Montgomery	267	2	4	..
Lyallpur	109	1	1	..
Jhang	74	1	..	..
Multan	196	1	1	..
Muzaffargarh	54	1	..	..
Dera Ghazi Khan	42	1	6	..
Total	*3,709	1	863	..
DELHI.				
Delhi	397	4	272	3

*Including 113 lbs. issued by the Medical Department of which details are not available.

TABLE M.—QUININE ISSUED BY PUBLIC HEALTH DEPARTMENTS, ETC.—*contd.*

Districts.	Quinine.		Cinchona febrifuge.	
	Total issues in lbs.	Grains per head of population.	Total issues in lbs.	Grains per head of population.
UNITED PROVINCES.				
Dehra Dun	56	2	27	1
Saharanpur	108	1	103	1
Muzaffarnagar	68	1	75	1
Meerut	102	..	4	..
Bulandshahr	80	1	152	1
Aligarh	68	..	57	..
Muttra	77	1	140	2
Agra	114	1	120	..
Mainpuri	28	..	41	..
Etah	47	..	49	..
Bareilly	155	1	94	1
Bijnor	39	..	80	1
Budaun	21	..	42	..
Moradabad	53	..	113	1
Shahjahanpur	23	..	82	1
Pilibhit	56	1	115	2
Farrukhabad	51	..	58	1
Etawah	18	..	23	..
Cawnpore	22	..	10	..
Fatehpur	19	..	63	1
Allahabad	70	..	126	1
Banda	36	..	5	..
Hamirpur	31	..	27	..
Jhansi	78	1	105	1
Jalaun	4	..	9	..
Benares	32	..	110	1
Mirzapur	25	..	55	1
Jaunpur	22	..	19	..
Ghazipur	19	..	26	..
Ballia	17	..	..	..
Gorakhpur	117	..	476	1
Basti	39	..	177	1
Azamgarh	17	..	10	..
Naini Tal	318	8	511	13
Almora	23	..	16	..
Garhwal	34	..	26	..
Lucknow	113	1	172	2
Unao	29	..	85	1
Rae Bareli	34	..	112	1

TABLE M.—QUININE ISSUED BY PUBLIC HEALTH DEPARTMENTS, ETC.—*contd.*

Districts.	Quinine.		Cinchona febrifuge.	
	Total issues in lbs.	Grains per head of population.	Total issues in lbs.	Grains per head of population.
UNITED PROVINCES—*contd.*				
Sitapur	43	..	73	..
Hardoi	37	..	30	..
Kheri	73	1	142	1
Fyzabad	29	..	26	..
Gonda	98	..	78	..
Bahraich	105	1	107	1
Sultanpur	14	..	45	..
Partabgarh	15	..	102	1
Bara Banki	37	..	17	..
Total	2,714	..	4,136	1
BIHAR AND ORISSA.				
Patna	8	..		
Gaya	11	..		
Shahabad	7	..		
Saran	8	..		
Champaran	13	..		
Muzaffarpur	17	..		
Darbhanga	14	..		
Bhagalpur	18	..		
Monghyr	13	..		
Purnea	53	..		
Santal Parganas	27	..		
Manbhum	17	..		
Singhbhum	13	..		
Ranchi	17	..		
Hazaribagh	9	..		
Palamau	3	..		
Puri	17	..		
Cuttack	42	..		
Balasore	20	..		
Sambalpur	11	..		
Angul	7	..		
Total	345	..		

NOTE.—Quinine or Cinchona febrifuge was not distributed free.

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TABLE M.—QUININE ISSUED BY PUBLIC HEALTH DEPARTMENTS, ETC.—*contd.*

Districts.	Quinine.		Cinchona febrifuge.	
	Total issues in lbs.	Grains per head of population.	Total issues in lbs.	Grains per head of population.
BENGAL.				
Mymensingh	2,293	3	..	..
Tippera	1,558	4	..	..
Dacca	1,320	3	..	..
Faridpur	1,195	4	..	..
Chittagong	1,075	4	..	..
Jessore	647	3	..	..
Noakhali	627	3	..	..
Rangpur	588	2	..	..
Khulna	495	2	..	..
Pabna	437	2	..	..
Nadia	389	2	..	..
Bakarganj	303	1	..	..
Burdwan	324	1	..	..
Bogra	278	2	..	..
Murshidabad	237	1	..	..
Rajshahi	207	1	..	..
Midnapur	191	1	..	..
24-Parganas	175	..	..	..
Malda	171	1	..	..
Bankura	160	1	..	..
Hooghly	156	1	..	..
Birbhum	134	1	..	..
Dinajpur	121	1	..	..
Calcutta	94	1	..	..
Jalpaiguri	79	1	..	..
Howrah	57	..	..	..
Darjeeling	18	..	..	..
Total	13,329	2	..	..
*** C. P. & BERAR.**				
Nagpur	287	2	91	1
Wardha	93	1	24	..
Chanda	86	1	40	1
Chhindwara	72	1	20	..
Betul	116	2	30	1
Jubbulpore	171	2	41	..
Saugor	150	1	36	..
Mandla	102	2	20	..
Hoshangabad	130	1	41	..

* Amounts issued from the Nagpur Factory are available and have been given.

TABLE M.—QUININE ISSUED BY PUBLIC HEALTH DEPARTMENTS, ETC. —*contd.*

Districts.	Quinine.		Cinchona febrifuge.	
	Total issues in lbs.	Grains per head of population.	Total issues in lbs.	Grains per head of population.
C. P. & BERAR—*contd.*				
Nimar	134	2	28	..
Raipur	123	1	36	..
Bilaspur	107	1	24	..
Drug	65	1	19	..
Bhandara	84	1	22	..
Balaghat	88	1	20	..
Amraoti	126	1	32	..
Akola	129	1	40	..
Yeotmal	107	1	7	..
Buldana	110	1	48	..
Total	2,280	1	619	..
BOMBAY PRESIDENCY.				
East Khandesh	40	..	..	..
West Khandesh	77	1	..	..
Surat	56	1	..	..
Broach	18	..	..	..
Kaira	139	1	..	..
Panch Mahals	47	1	..	..
Ahmedabad	114	1	..	..
Ahmednagar	21	..	..	..
Poona	47	..	..	..
Nasik	54	..	..	..
Thana	28	..	..	..
Bombay Suburban	10	..	..	..
Bombay City	8*	5*	..	..
Kolaba	27	..	..	..
Ratnagiri	7	..	..	..
Belgaum	64	..	..	..
Dharwar	89	1	..	..
Bijapur	17	..	..	..
Kanara	113	2	..	..
Sholapur	19	..	..	..
Satara	71	..	..	..
Karachi	79	1	..	..
Dadu	7	..	..	..
Hyderabad	215	2	..	..
Nawabshah	139	2	..	..
Thar and Parkar	109	2	..	..
Larkana	127	2	..	..
Sukkur	232	3	..	..
Upper Sind Frontier	74	2	..	..
Total	2,048†	1	..	..

* The figs. relate to two jails.

† These represent free issues and exclude 8 lbs. issued free on railways. In addition, quinine hydrochloride treatments worth Rs. 5,477 was sold by the Public Health Department and quinine worth Rs. 18,470 was sold through Post Offices.

TABLE M.—QUININE ISSUED BY PUBLIC HEALTH DEPARTMENTS, ETC. —*contd.*

Districts.	Quinine.		Cinchona febrifuge.	
	Total issues in lbs.	Grains per head of population.	Total issues in lbs.	Grains per head of population.
MADRAS PRESIDENCY.				
Anantapur	349	23	..	..
Bellary	396	29	..	..
Chingleput	39	2	..	..
Chittoor	136	1	2	..
Coimbatore	121	3	..	..
Cuddapah	167	1	30	..
Ganjam	145	4	..	..
Godavari	271	1	43	..
Guntur	225	1	37	..
Kistna	51	3	..	..
Kurnool	107	7	..	..
Madura	239	1	50	..
Madras	185	2	64	1
Malabar	143	..	21	..
Nellore	171	8	..	..
The Nilgiris	213	9	8	..
North Arcot	173	5	..	..
Ramnad	150	1	16	..
Salem	88	3	..	..
South Arcot	39	1	..	..
South Kanara	766	39	..	..
Tanjore	172	1	..	..
Tinnevelly	70	2	..	..
Trichinopoly	98	4	..	..
Vizagapatam	164	1	24	..
Total	4,678	1	295	..
*Coorg	366	16	215	9
ASSAM.				
Cachar	69	1	41	1
Sylhet	77	..	74	..
Goalpara	318	3	379	3
Kamrup	2,314	17	113	1
Darrang	146	2	167	2
Nowgong	28	..	75	1
Sibsagar	107	1	150	1
Lakhimpur	95	1	50	1
K. & J. Hills	167	11	1,660	106
Garo Hills	69	3	14	1
Sadiya Frontier Tract	151	20	27	4
Naga Hills	75	3	64	3
Manipur State	101	2	122	2
Lushai Hills	212	12	44	3
Total	3,929	3	2,980	2

*In addition, 20 lbs. of totaquina were issued.

TABLE M.—QUININE ISSUED BY PUBLIC HEALTH DEPARTMENTS, ETC.—*concld.*

Districts.	Quinine.		Cinchona febrifuge.	
	Total issues in lbs.	Grains per head of population.	Total issues in lbs.	Grains per head of population.
BURMA.				
Akyab (including Arakan Hill District)	1	..	116	1
Kyaukpyu	3	..	14	..
Sandoway	..	..	3	..
Pegu	..	..	77	1
Tharrawaddy	6	..	24	..
Hanthawaddy	..	..	21	..
Insein	6	..	58	1
Prome	5	..	33	1
Bassein	12	..	55	1
Henzada	2	..	25	..
Myaungmya	4	..	24	..
Maubin	1	..	1	..
Pyapon	..	..	44	1
Thaton	10	..	27	..
Amherst	2	..	26	..
Tavoy	2	..	36	1
Mergui	1	..	74	3
Toungoo	9	..	102	2
Thayetmyo	5	..	9	..
Minbu	..	..	104	1
Magwe	1	..	6	..
Pakokku	..	..	13	..
Chin Hills	..	..	34	1
Mandalay	7	..	42	1
Kyaukse	..	..	14	1
Meiktila	..	..	6	..
Myingyan	3	..	..	..
Yamethin	1	..	12	..
Bhamo	2	..	197	11
Myitkyina	..	..	100	4
Shwebo	..	..	47	1
Sagaing	..	..	1	..
Katha	2	..	30	1
Upper Chindwin	..	..	8	..
Lower Chindwin	1	..	13	..
Northern Shan States	..	..	202	2
Southern Shan States	..	..	181	1
Rangoon	1	..	..	..
Total	85	..	1,778	1
Total including issues from the Medical Store Depôt	2,123	1	1,895	1
RAJPUTANA.				
Ajmer-Merwara	79	1	82	1

Appendix III

relating to

Section III.

TABLE A.—MATERNAL MORTALITY PER 1,000 BIRTHS IN CERTAIN TOWNS.

	1933.		1932.	
	Deaths.	Death rate.	Deaths.	Death rate.
Delhi.				
Delhi City	104	7	53	3
Delhi Ntd. Area	27	31	..	..
United Provinces.				
Lucknow	119	10	127	10
Agra	68	5	93	8
Cawnpore	74	6	128	11
Allahabad	73	9	70	9
Benares	111	9	104	9
Moradabad	48	8	62	11
Aligarh	22	7	29	9
Bareilly	28	4	48	7
Saharanpur	30	8	33	8
Hathras	19	8	24	11
Muttra	32	10	19	6
Muzaffarnagar	12	7	18	11
Meerut	13	5	25	8
Jhansi	6	2	16	4
Central Provinces.				
Nagpur	80	8	86	8
Amraoti	48	20	50	22
Raipur	16	9	28	14
Burhanpur	33	16	23	11
Akola	40	21	28	15
Jubbulpore	27	8	22	6
Khamgaon	6	6	5	5
Bombay Presidency.				
Bombay City	233	8	136	5
Ahmedabad	204	12	209	13
Karachi	108	9	109	9
Surat	56	10	54	11
Sukkur	43	18	38	18
Shikarpur	67	29	62	27
Hyderabad	37	11	53	18
Poona	49	10	27	5
Larkana	18	24	33	43
Nasik	26	25	28	24
Sholapur	57	8	37	6
Satara	2	4	10	22
Ahmednagar	15	7	19	9

TABLE A.—MATERNAL MORTALITY PER 1,000 BIRTHS IN CERTAIN TOWNS—*contd.*

	1933.		1932.	
	Deaths.	Death rate.	Deaths.	Death rate.
Madras Presidency.				
Chingleput	17	22	22	31
Tanjore	62	23	57	22
Guntur	73	28	81	30
Nellore	66	32	50	27
Negapatam	29	19	45	28
Nandyal	9	11	19	21
Anantapur	8	14	18	33
Mayavaram	3	3	10	10
Kurnool	32	20	22	13
Cuddapah	18	22	35	39
Kumbakonam	52	24	35	16
Tinnevelly	33	16	30	16
Cuddalore	42	20	38	18
Trichinopoly	63	13	54	12
Conjeeveram	35	13	42	19
Calicut	65	23	51	17
Rajahmundry	28	12	38	18
Palamcottah	27	13	30	16
Madura	107	16	86	13
Vellore	36	12	39	13
Cocanada	37	17	22	13
Tuticorin	22	9	26	13
Bezwada	33	12	29	11
Ellore	26	13	20	11
Madras	331	12	279	10
Burma.				
Mandalay	50	7	59	8
Moulmein	23	13	20	11
Rangoon town	54	6	50	6
Myingyan	17	16	21	21
Akyab	9	12	5	8
Prome	14	12	16	16
Pegu	12	14	18	21
Coorg.				
Mercara	2	12	..	..

TABLE B.—MATERNITY AND CHILD WELFARE CENTRES IN RURAL AND URBAN AREAS.

	Centres maintained by													
	Govt.		Local and Municipal bodies.		Other Agencies.		Total.		Trained visitors.		Trained midwives.		Trained *dais*.	
	R	U	R	U	R	U	R	U	R	U	R	U	R	U
Total	2	6	186	157	71	149	259	312	34	186	1,052	883	1,237	1,157
N.-W. F. P.	..	..	..	1	..	1	..	2	..	1	..	3	..	17
Punjab.	..	..	21	21	14	31	35	52	20	38	4	23	94	421
Delhi	..	..	1	16	..	5	1	21	..	14	6	7	..	117
U. P.	..	..	118	56	3	5	121	61	..	14	..	..	121	113
B. & O.	..	6	..	5	4	7	4	18	..	7	4	18	..	5
Bengal.	..	..	7	..	..	..	7	..	5	..	47	..	974	196
C. P.	..	..	..	..	15	42	15	42	4	44	4	4	10	248
Bombay	..	..	9	11	..	13	9	24	..	22	15	114	9	35
Madras.	..	..	30	47	35	28	65	75	5	38	849	586	29	4
Coorg	Not available.										7	7		
Assam	..	..	..	..	..	2	..	2	..	..	3	9	..	1
Burma	2	..	..	..	..	15	2	15	..	8	113	112	...	...
Ajmer-Merwara	Not available.													

R — Rural areas.
U — Urban areas.

Appendix IV

relating to

Section IV.

TABLE SHOWING THE DISTRIBUTION OF

	Rural Areas.									
	Medical Officers of Health.						Vaccinators.			
	Holding D. P. H.		Licentiates L. P. Hs.		Epidemic Staff.	Sanitary and Health Inspectors.	M.	F.	School Medical Officers.	Other Health Staffs.
	Whole time.	Part time.	Whole time.	Part time.						
Total	143	4	68	...	265	1,202	5,953	25	15	260
N.-W. F. P.	...	...	...	...	2	...	24	...	...	2
Punjab	28	...	...	...	31	43	333	...	...	43
Delhi	...	1	...	...	...	1	3	...	5 (Part time).	12
U. P.	39	...	28	...	42	121	821	...	...	...
B. & O.	11	...	24	...	33	69	1,097	1	10	31
Bengal	26	...	...	...	...	583	1,717	23	...	58
C. P.	...	...	...	...	33	...	253	...	...	35
Bombay	3	...	1	...	61	8	372	...	...	42
Madras	33	...	15	...	24	325	623	...	...	...
Assam	...	...	...	...	15	...	410	1	...	...
Burma	3	...	...	...	24	52	300	...	...	37

Health Staffs in Rural and Urban areas.

Urban Areas.									
Medical Officers of Health.					Vaccinators.				
Holding D. P. H.		Licentiates L. P. Hs.		Sanitary and Health Inspectors	M.	F.	Inspectors of Vaccination.	School Medical Officers.	Other Health Staffs.
Whole time.	Part time.	Whole time.	Part time.						
146	5	92	...	1,105	1,103	25	116	81	436
1	...	...	...	8	8	1	6	5	...
12	...	...	...	116	132	8	8	5	28
1	3	...	...	16	8	...	...	3	26
20	...	13	...	165	185	...	...	13	...
11	1	...	...	63	77	2	19	10	3
27	...	1	...	126	276	9	21	...	...
2	...	1	...	68	63	...	...	...	5
20	...	46	...	144	58	2	2	6	215
38	...	28	...	266	175	3	18	6	41
1	...	...	...	13	24	...	41	...	97
13	1	3	...	120	7	...	1	33	21

Appendix V

relating to

Section VI.

TABLE A.—VACCINATION STATISTICS FOR 1933-34.

Province.	Population.	Operations performed.			Percentage of success.		Children successfully vaccinated.		Total cost.	Average cost per successful case.	Rate of successful vaccinations per 1,000 of population.	Percentage of annual births successfully vaccinated.
		P.	R.	Total.	P.	R.	Under 1 year.	1 to 6 years.				
									Rs.	Rs. A. P.		
British India . .	269,447,659	9,919,054	12,224,316	22,143,370	97	51	4,195,159	4,022,512	34,48,188	0 4 0	52	43
N.-W. F. P. . .	3,515,628	206,382	141,242	347,624	98	84	99,970	74,948	28,801	0 1 6	86	141
Punjab . . .	23,454,352	950,385	2,255,971	3,206,356	98	69	712,769	130,571	3,79,816	0 2 10	91	68
Delhi . . .	636,246	16,979	18,958	35,937	96	72	13,286	1,682	8,484	0 5 1	42	46
U. P. . . .	48,408,763	1,522,517	241,726	1,764,243	96	40	947,544	425,559	3,80,031	0 4 0	32	50
B. & O. . .	37,677,576	1,065,592	851,134	1,916,726	99	64	318,457	670,365	1,43,729	0 1 8	37	24
Bengal . . .	50,114,002	2,532,230	4,107,104	6,639,334	89	43	303,146	1,475,184	4,39,021	0 1 9	80	21
C. P. . . .	15,507,723	570,833	117,798	688,631	97	53	414,278	112,571	1,98,940	0 5 7	37	60
Bombay . . .	21,855,300	688,659	301,371	990,030	100	53	459,184	171,698	5,80,166	0 12 9	34	58
Madras . . .	45,204,545	1,297,829	3,254,926	4,552,755	97	34	659,270	411,567	7,10,354	0 5 8	45	39
Coorg . . .	163,327	7,524	8,053	15,577	94	60	1,329	4,490	5,737	0 8 5	69	33
Assam . . .	9,247,857	402,375	304,085	706,460	92	61	66,761	240,352	1,09,548	0 3 9	55	27
Burma . . .	13,102,048	634,233	619,653	1,253,886	97	31	181,103	300,640	4,55,291	0 10 3	54	50
Ajmer-Merwara	560,292	23,516	2,295	25,811	95	97	18,062	2,975	3,470	0 5 6	44	83

P = Primary.
R = Revaccinations.

TABLE B.—VACCINATIONS PERFORMED IN BRITISH AND INDIAN ARMIES DURING 1933.

(i) OFFICERS AND OTHER RANKS.

British Troops.

Commands.	Officers. Number. P.	Officers. Number. R.	Officers. Per cent. success. P.	Officers. Per cent. success. R.	W. Os., N. C. Os. and men. Number. P.	W. Os., N. C. Os. and men. Number. R.	W. Os., N. C. Os. and men. Per cent success. P.	W. Os., N. C. Os. and men. Per cent success. R.
TOTAL	2	992	100	76	218	21,246	95	72
Northern	...	394	...	81	133	8,627	98	80
Western	2	70	100	93	81	575	90	88
Eastern	...	305	...	72	1	7,199	100	67
Southern	...	221	...	66	3	4,392	100	61
Burma District	...	2	...	100	...	453	...	78

Indian Troops.

Commands.	European Officers. Number. P.	European Officers. Number. R.	European Officers. Per cent. success. P.	European Officers. Per cent. success. R.	I. C. Os., N. C. Os. and Men. Number. P.	I. C. Os., N. C. Os. and Men. Number. R.	I. C. Os., N. C. Os. and Men. Per cent. success. P.	I. C. Os., N. C. Os. and Men. Per cent. success. R.	Followers. Number. P.	Followers. Number. R.	Followers. Per cent. success. P.	Followers. Per cent. success. R.
TOTAL	1	782	100	75	1,271	60,347	79	72	98	16,985	74	76
Northern	...	388	...	92	170	30,326	93	84	35	9,445	100	87
Western	...	58	...	69	26	3,312	77	84	1	635	100	89
Eastern	...	169	...	39	759	15,065	74	54	40	3,300	77	55
Southern	1	164	100	76	316	11,024	85	61	22	3,519	27	64
Burma District	...	3	...	66	...	620	...	80	...	86	...	68

(ii) FAMILIES (BRITISH ARMY).

Commands.	Women. Number. P.	Women. Number. R.	Women. Per cent. success. P.	Women. Per cent. success. R.	Children. Number. P.	Children. Number. R.	Children. Per cent. success. P.	Children. Per cent. success. R.
TOTAL	31	2,050	84	79	717	2,532	90	80
Northern.	25	800	100	76	235	949	98	80
Western	1	118	...	88	68	98	90	91
Eastern	5	592	20	80	199	709	89	74
Southern	...	524	...	79	183	748	82	84
Burma District	...	16	...	87	32	28	91	89

(iii) FAMILIES (INDIAN ARMY).

Commands.	Women. Number. P.	Women. Number. R.	Women. Per cent. success. P.	Women. Per cent. success. R.	Children. Number. P.	Children. Number. R.	Children. Per cent. success. P.	Children. Per cent. success. R.
TOTAL	1	513	100	80	81	404	96	73
Northern	...	201	...	91	28	118	100	86
Western	...	38	...	58	8	31	100	84
Eastern	1	175	100	74	38	195	92	65
Southern	...	96	...	78	7	51	100	75
Burma District	...	3	...	100	...	9	...	11

W. Os.—Warrant Officers.
N. C. Os.—Non-Commissioned Officers
I. C. Os.—Indian Commissioned Officers.

Appendix VI

relating to

Section VIII.

List of Scientific Papers by Research workers under the Government of India, the Indian Research Fund Association and Provincial Governments published during 1933.

A.—(i) Papers published in the Indian Journal of Medical Research (I. J. M. R.) and its Memoirs.

Acton, H. W., Ghosh, S., and Dutt, A.

The Vitamin B Content of different Samples of Indian Rice by Spruyt's Colorimetric Method. Part II. (Volume XXI, No. 1.)

Ahmad, Bashir, and Malik, K. S.

The Metabolism of Carotene in different Animals. (Volume XX, No. 4).

Ahuja, M. L.

A Note on Tests of the Value of Stock Organisms used for T. A. B. Vaccine. (Volume XXI, No. 1).

Asheshov, Igor N., Asheshov, Inna, Khan, Saranjam, and Lahiri, M. N.

Studies on Cholera Bacteriophage. Part I. General Technique. (Volume XX, No. 4).

Asheshov, Igor N., Asheshov, Inna, Khan, Saranjam, Lahiri, M. N., and Chatterji, S. K.

Studies on Cholera Bacteriophage. Part II. Classification of Bacteriophages and its Practical Application. (Volume XX, No. 4).

Asheshov, Igor N., Asheshov, Inna, Lahiri, M. N., and Chatterji, S. K.

Studies on Cholera Bacteriophage. Part III. Virulence and Development of Bacteriophage. (Volume XX, No. 4).

Barraud, P. J.

A Method of making Slide Smears from Female *Anopheles*, for Examination for Sporozoites of Malaria Parasites, and of Preserving the Mosquitoes for Reference. (Volume XXI, No. 2).

Bhatia, B. B., and Lal, S.

The Pharmacological Action of *Plumbago zeylanica* and its Active Principle (Plumbagin). (Volume XX, No. 3).

Boyd, T. C., and De, N. K.

Some Applications of the Spectroscope in Medical Research. (Volume XX, No. 3).
Some Applications of Quantitative Spectroscopic Analysis. (Volume XXI, No. 1).

Chaudhuri, H. P.

Normal Age Distribution in India. (Volume XXI, No. 1).
Is Halometry Reliable? A Statistical View. (Volume XXI, No. 2).

Chopra, R. N., and Chaudhury, S. G.

Studies on the Physical Properties of different Blood Sera. Part V. Buffer Action. (Volume XXI, No. 1).
On the Electric Charge of Erythrocytes. Part II. Malaria. (Volume XXI, No. 2).

Chopra, R. N., and Chowhan, J. S.

Biological Assay of Digitalis Preparations in the Tropics. Part III. (Volume XX, No. 4).

Chopra, R. N., Gupta, J. C., and Chopra, G. S.

Pharmacological Action of Kurchicine (An alkaloid of *Holarrhena antidysenterica*). (Volume XXI, No. 2).

Chopra, R. N., Gupta, J. C., and Mukherjee, B.

The Pharmacological Action of an Alkaloid obtained from *Rauwolfia serpentina*, Benth. A Preliminary Note. (Volume XXI, No. 2).

Chopra, R. N., and Mukherjee, B.

The Pharmacological Action of 'Thevetin'—A Glucoside occurring in *Thevatia neriifolia* (Yellow Oleander). (Volume XX, No. 3).

Chopra, R. N., Mukherjee, B., and Campbell, H. G. M.

The Pharmacological Action and Anti-Malarial Properties of Anhydrocotarnine-Resorcinol-Hydrochloride (A Derivative of Narcotine). (Volume XXI No. 2).

Chopra, R. N., and Roy, A. C.

A Proteolytic Enzyme in Cucumber (*Cucumis sativus*). (Volume XXI, No. 1).

Cunningham, J., Malone, R. H., and Craighead, A. C.

An Investigation into the Value of an Etherized Vaccine in the Prophylactic Treatment of Rabies. Part VIII. The Comparative Immunizing Value of Carbolized, Etherized-Carbolized and Etherized Vaccines tested under Identical Conditions of Dosage and Administration. (Indian Medical Research Memoir No. 26, January 1933).

David, J. C., and Vareed, C.

The Action of Quinamine on the Heart. (Volume XX, No. 4).

Ghose, A. C.

The Cholesterol Content of Blood in Indians and its Significance in Jaundice. (Volume XX, No. 3).

The Significance of the Blood Cholesterol in the Surgery of the Genito-Urinary System. (Volume XX, No. 3).

Cholesterosis of the Gall-Bladder in Indians. (Volume XX, No. 4).

On the Bacterial Infection of the Gall-Bladder. (Volume XX, No. 4).

Ghosh, A. R., Chakravorty, P. N., and Guha, B. C.

Further Observations on Vitamin A in Indian Fish-Liver Oils. (Volume XXI, No. 2).

Ghosh, A. R., and Guha, B. C.

Investigations on the Nutritive Values of Indian Food-Stuffs. Part I. (Volume XXI, No. 2).

Ghosh, S., and Dutt, A. T.

The Vitamin B Content of different Samples of Indian Rice by Spruyt's Colorimetric Method. Part I (Volume XX, No. 3).

Greval, S. D. S.

On Rabies. Complement-Fixation in Rabies. The Technique, its Purpose and Associated Considerations (Volume XX, No. 3).

Greval, S. D. S., and Dalal, N. P.

On *Bacillus pestis*: New Techniques in Serology. (Volume XXI, No. 2).

Grewal, K. S., Kochhar, B. D., and Ray, J. N.

Pharmacological Action of certain Derivatives of Cotarnine. (Volume XXI, No. 2).

Guha, B. C., and Chakravorty, P. N.

The Vitamin content of the Indian Mango. (Volume XX, No. 4).

Further Observations on Vitamin B_2. (Volume XXI, No. 1).

Observations on the Chemistry of the Oxytocic Hormone of the Pituitary Gland. Part I. (Volume XXI, No. 2).

Hughes, T. A.

Observations on Cirrhosis of the Liver as seen in the Punjab. (Volume XXI, No. 2).

Iyengar, M. O. T.

Experimental Infection of Anopheline Mosquitoes. (Volume XX, No. 3).
Filariasis in Trivandrum. (Volume XX, No. 4).
Oviposition in Mosquitoes of the Sub-Genus *Mansonioides*. (Volume XXI, No. 1.

Iyer, P. V. Seetharama.

A Rat-Flea Survey of the Mysore State. (Volume XX, No. 4).

King, H. H., and Iyer, P. V. Seetharama.

The Seasonal Prevalence of Rats and Rat-Fleas in Parts of South India. (Volume XX, No. 4).

Knowles, R., and Basu, B. C.

The Nature of the so-called 'Black Spores' of Ross in Malaria-Transmitting Mosquitoes. (Volume XX, No. 3).

Korke, Vishnu T.

Observations on Filariasis in some Areas in British India. Part IX. Sind Area. (Volume XXI, No. 2).

Krishnan, B. T., and Vareed, C.

A Further Study on the Vital Capacity of South Indians. (Volume XXI, No. 1).

Krishnan, K. V.

Observations on the Mode of Action of Quinine in Malaria. (Volume XXI, No. 2).

Krishnan, K. V., and Lal, Chiranji.

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Appendix VII

relating to

Section IX.

TABLE SHOWING THE DISTRIBUTION OF MEDICAL PERSONNEL

N.-W.

	Provincial Headquarters—Hospitals and Dispensaries.												District Headquarters and other Urban Areas.									
	State public.		State special.		Local and Municipal Funds.		Private Aided.		Private Non-Aided.		Railways.		State public.		State special.		Local and Municipal Funds.		Private Aided.		Private Non-Aided.	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
I. M. S. Officers	1	...	...	...	...	1*	...	...	1†	...	...	...	...	...	...	...	2	1*	...	...	1†	1†
I. M. D. Officers	2	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Salaried Graduates (or Assistant Surgeons).	6	...	...	...	...	...	...	...	1	...	...	...	...	...	1	...	8	...	...	1	...	...
Salaried Licentiates (or Sub-Assistant Surgeons).	4	...	...	...	2	2	...	...	1	...	1	...	1	...	1	...	10	5	...	1	2	...
Honorary Graduates (or Assistant Surgeons).	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...
Honorary Licentiates (or Sub-Assistant Surgeons).	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	1	...	...	...
Nurses—																						
(*a*) Europeans and Anglo-Indians.	...	4	...	...	...	1	...	...	...	2	...	...	...	...	...	...	...	1	...	3	...	2
(*b*) Indians	...	4	...	...	...	5	...	...	...	11	...	...	...	...	...	...	...	...	8	16	3	3
Midwives	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	1	...	2
Dais	...	2	...	...	...	10	...	...	...	...	...	...	...	...	...	...	...	4	2	5	...	...
Compounders	26	...	3	...	4	1	...	...	1	...	1	...	2	...	8	...	30	4	2	1	2	1

* European doctors attached to Mission Hospitals
† Lady doctors of the W. M. S. attached to Zenana

PUN

	Provincial Headquarters—Hospitals and Dispensaries.												District Head			
	State public.		State special.		Local and Municipal Funds.		Private Aided.		Private Non-Aided.		Railways.		State public.		State special.	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
I. M. S. Officers.	12	...	...	...	...	...	1	...	...	...	...	...	3	...	1	...
I. M. D. Officers	*8	...	...	...	2	...	...	...	...	...	4	...	1	...	1	...
Salaried Graduates (or Assistant Surgeons).	39	4	...	...	...	...	1	1	...	...	1	...	26	1	1	...
Salaried Licentiates (or Assistant Medical Officers).	5	3	11	...	2	...	...	1	...	...	7	...	18	19	70	...
Honorary Graduates (or Assistant Surgeons).	...	...	...	...	...	...	...	...	...	...	...	...	4	...	...	...
Honorary Licentiates (or Assistant Medical Officers).	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Nurses—																
(*a*) Europeans and Anglo-Indians.	...	67	...	...	...	...	...	10	...	...	4	...	...	20	...	...
(*b*) Indians	...	42	...	...	...	...	...	...	...	...	...	...	...	3	...	...
Midwives	...	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Dais	...	27	...	...	...	2	...	...	...	...	...	...	...	12	...	1
Compounders	67	11	6	...	4	...	1	1	...	...	8	...	45	5	31	...

* One of these is employed as Assistant Inspector (§) Medical Officers in charge

IN THE DIFFERENT PROVINCES DURING THE YEAR 1933.

F. P.

Rural Areas.												Agencies										Total.
Railways.		State public.		State special.		Local and Municipal Funds.		Private Aided.		Private Non-Aided.		Railways.		State public.		State special.		Local and Municipal Funds.		Private Aided.		Private Non-Aided.		Railways.		
M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	
...	...	...	...	...	...	...	...	...	...	...	...	...	...	2	...	1	...	...	...	...	...	...	...	...	...	11
...	...	...	...	2	...	...	...	...	...	...	...	...	...	2	...	5	...	...	...	...	...	1	...	...	...	13
...	...	1	...	...	...	2	...	1	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	22
4	...	11	...	3	...	11	2	...	...	...	...	...	...	8	...	11	...	...	...	...	...	...	...	...	...	80
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	3
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	13
...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	51
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	5
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	23
4	...	10	...	12	...	20	1	2	...	1	...	...	...	21	...	21	...	...	1	...	...	1	...	...	...	180

at Peshawar, Tank and Dera Ismail Khan.
Hospitals at Peshawar and Dera Ismail Khan.

JAB.

quarters and other Urban Areas.							Rural Areas.										Total.
Local and Municipal Funds.		Private Aided.		Private Non-Aided.		Railways.	State public.		State special.		Local and Municipal Funds.		Private Aided.		Private Non-Aided.		Railways.		
M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	
2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	19
...	...	1	...	...	...	5	...	...	...	...	...	...	...	...	...	...	...	...	...	22
28	5	2	7	1	...	8	...	5	...	3	...	42	...	...	...	...	...	...	...	175
119	2	3	8	...	2	56	...	...	...	76	...	261 4§ 374 ...	3	1	1	...	...	...		1,046
...	...	...	1	5	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	10
...	...	...	...	...	1	...	...	...	...	...	...	2	...	...	...	...	...	...	...	3
...	14	...	40	...	3	4	...	...	...	...	...	...	...	...	1	...	...	...	...	163
...	3	...	40	8	23	1	...	...	...	...	...	...	...	...	3	...	...	...	...	123
..	6	...	6	...	2	1	...	...	...	...	...	...	...	...	...	...	...	...	...	17
...	60	...	9	...	6	...	...	...	4	...	2	...	54	...	5	...	...	...	...	182
311	25	3	15	16	5	47	...	13	...	65	...	582	4	3	1	1	...	..	...	1,270

General of Civil Hospitals, Punjab.
of rural dispensaries.

UNITED

	Provincial Headquarters—Hospitals and Dispensaries.												District Head			
	State public.		State special.		Local and Municipal Funds.		Private Aided.		Private Non-Aided.		Railways.		State public.		State special.	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
I. M. S. Officers	...	...	...	...	...	...	1	...	...	...	...	...	4	...	...	...
Salaried Graduates (or Assistant Surgeons).	2	...	...	...	...	...	...	...	...	...	1	...	4	...	...	...
I. M. D. Officers	1	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...
Salaried Licentiates (or Sub-Assistant Surgeons).	...	...	1	...	...	...	...	...	...	...	...	...	24	7	47	...
Honorary Graduates (or Assistant Surgeons).	...	...	...	...	1	...	...	...	...	...	...	...	9	...	...	...
Honorary Licentiates (or Sub-Assistant Surgeons).	...	...	...	...	...	...	...	...	...	...	...	...	5	...	...	...
Nurses—																
(a) Europeans and Anglo-Indians.	...	...	...	...	...	...	...	16	...	...	...	...	...	45	...	...
(b) Indians	...	...	...	...	2	2	...	...	...	...	...	...	...	...	...	...
Midwives	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	1
Dais	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	1
Compounders	...	...	1	...	3	1	1	...	...	...	...	...	34	2	48	1

BIHAR.

I. M. S. Officers	5	...	...	...	...	...	...	...	...	...	...	...	2	...	...	...
Women's Medical Service personnel.	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
I. M. D. Officers	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Salaried Graduates (or Assistant Surgeons).	48	...	1	...	3	...	...	...	1	2	...	...	14	1	...	...
Salaried Licentiates (or Assistant Medical Officers).	3	3	3	...	2	2	...	...	1	1	...	...	17	1	22	...
Honorary Graduates (or Assistant Surgeons).	...	...	...	...	1	...	...	...	1	...	...	...	2	...	...	...
Honorary Licentiates (or Assistant Medical Officers).	...	...	...	...	2	...	...	...	...	...	...	...	...	...	...	...
Nurses—																
(a) Europeans and Anglo-Indians.	...	52	...	...	...	3	...	...	...	3	...	...	...	6	...	...
(b) Indians	...	...	...	...	...	4	...	...	...	24	...	...	...	5	...	...
Midwives	...	...	...	...	...	1	...	...	...	...	...	...	...	4	...	...
Dais	...	...	...	...	...	4	...	...	...	...	...	...	...	1	...	...
Compounders	12	...	1	...	4	...	...	...	...	5	...	...	11	...	16	...

PROVINCES.

Quarters and other Urban Areas.								Rural Areas.												Total.
Local and Municipal Funds.		Private Aided.		Private Non-Aided		Railways.		State public.		State special.		Local and Municipal Funds.		Private Aided.		Private Non-Aided.		Railways.		
M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	
9	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	14
85	12	7	19	3	2	7	1	2	...	...	...	23	2	1	...	8	1	1	...	181
2	...	1	...	...	...	2	...	...	...	...	...	...	...	...	...	...	...	...	...	7
79	23	3	18	6	9	34	...	12	...	4	...	184	12	13	3	41	3	5	...	583
16	...	6	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	33
2	...	5	...	...	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	14
...	3	...	22	...	11	...	15	...	...	...	...	...	...	...	...	...	1	...	...	113
9	12	8	30	...	30	...	8	...	...	...	...	...	2	...	1	...	4	...	...	108
...	37	...	22	...	5	...	2	...	1	...	...	...	24	...	20	1	7	...	...	121
...	26	...	14	...	30	...	...	1	...	...	...	...	10	...	...	...	28	...	...	111
299	32	18	25	14	7	40	6	16	...	4	...	260	14	10	3	44	3	...	...	891

AND ORISSA.

																				Total.	
																				M.	F.
4	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	11	...
...	...	...	1	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2
1	...	...	...	...	...	1	...	1	...	...	...	...	...	...	...	...	...	2	...	5	...
51	2	2	3	8	1	12	...	...	...	...	...	21	...	1	...	6	...	5	...	173	9
40	21	2	4	30	5	30	...	23	...	3	...	437	7	19	...	43	...	36	...	711	44
4	1	...	...	4	...	...	...	...	...	...	...	...	...	...	...	...	2	...	...	14	1
6	...	...	...	6	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	15	...
...	2	...	5	...	5	...	8	...	...	...	...	...	...	...	1	...	5	...	2	...	92
4	29	...	33	...	6	...	6	...	1	...	...	...	2	...	...	...	7	...	2	4	119
...	17	...	5	...	4	...	...	...	2	...	...	...	20	...	...	...	...	...	...	...	53
...	39	...	3	...	22	...	...	...	1	...	...	...	19	...	...	...	3	...	...	...	92
105	2	5	1	41	2	30	...	22	...	...	...	419	...	8	...	39	...	29	...	742	10

BENGAL

	Provincial Headquarters—Hospitals and Dispensaries.												District Head			
	State public.		State special.		Local and Municipal Funds.		Private Aided.		Private Non-Aided.		Railways.		State public.		State special.	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
I. M. S. Officers	12	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
I. M. D. Officers	9	...	...	...	...	...	...	...	...	...	...	...	1	...	1	...
Salaried Graduates (or Assistant Surgeons).	60	1	2	...	18	1	41	8	17	1	2	...	12	...	5	...
Salaried Licentiates (or Assistant Medical Officers).	35	1	7	...	2	7	10	3	14	2	1	...	29	1	43	...
Honorary Graduates (or Assistant Surgeons).	121	4	...	...	...	...	56	...	23	...	...	...	...	...	...	...
Honorary Licentiates (or Assistant Medical Officers).	12	...	...	...	...	...	1	...	8	...	...	...	20	...	...	...
Nurses—																
(*a*) Europeans and Anglo-Indians	...	326	...	...	...	...	...	20	...	7	...	...	...	3	...	...
(*b*) Indians	...	39	8	...	...	18	...	96	27	17	...	...	...	4	...	...
Midwives	...	23	...	...	...	27	...	17	...	3	...	...	...	1	...	1
Dais	...	2	...	...	...	...	...	19	...	...	...	...	...	1	...	...
Compounders	35	...	5	...	24	2	21	3	17	...	2	...	15	1	39	...

CENTRAL PROVIN

I. M. S. Officers	1	...	...	...	...	...	...	...	...	...	...	...	3	...	...	...
W. M. S. Officers	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...
I. M. D. Officers	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Salaried Graduates (or Assistant Surgeons).	10	1	...	...	...	...	...	1	...	4	2	...	5	...	...	...
Salaried Licentiates (or Assistant Medical Officers).	9	1	1	...	5	...	...	1	...	...	4	...	11	1	18	...
Honorary Graduates (or Assistant Surgeons).	7	...	...	...	...	...	...	...	...	...	...	...	6	1	...	...
Honorary Licentiates (or Assistant Medical Officers).	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...
Nurses—																
(*a*) Europeans and Anglo-Indians	...	4	...	...	...	...	...	...	...	2	...	...	...	7	...	...
(*b*) Indians	...	4	...	...	...	...	...	7	...	5	...	...	...	5	...	...
Midwives	...	...	...	...	...	5	...	2	...	1	...	...	...	5	...	...
Dais	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Compounders	7	...	1	...	12	...	...	2	...	2	5	...	19	...	18	...

PRESIDENCY.

quarters and other Urban Areas.								Rural Areas.												Total.
Local and Municipal Funds.		Private Aided.		Private Non-Aided.		Railways.		State public.		State special.		Local and Municipal Funds.		Private Aided.		Private Non-Aided.		Railways.		
M.	F.	M.	F.	M.	F.	M.	F.	M.	F	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	
10	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	23
2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	13
58	...	21	1	24	5	33	...	...	...	...	...	15	...	4	...	26	...	7	...	357
245	14	36	6	39	2	102	...	4	...	9	...	507	...	67	1	83	...	46	...	1,316
11	...	2	...	...	...	...	...	...	...	...	...	...	...	3	1	2	...	...	...	223
12	...	12	1	1	...	2	...	...	...	...	...	4	...	1	...	1	...	...	...	75
3	6	...	10	...	5	3	20	...	...	...	...	...	...	...	2	...	1	...	3	409
1	25	1	20	11	38	1	7	...	...	...	...	...	1	2	6	...	...	...	...	317
...	53	...	4	...	5	...	3	...	...	...	...	...	6	...	5	...	2	...	1	151
...	12	...	3	...	...	...	1	...	...	...	...	...	2	...	1	...	...	...	...	41
298	...	38	2	53	9	109	...	...	...	4	...	395	1	46	1	91	...	41	...	1,252

CES AND BERAR.

...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	5
...	...	...	4	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	5
2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2	...	...	...	4
86	9	...	7	3	3	3	...	...	...	...	...	...	...	...	...	...	2	3	...	89
79	11	1	4	8	2	15	...	2	...	1	...	114	...	7	...	15	1	12	...	323
3	...	3	...	1	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	22
...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	1	...	...	...	3
...	...	...	2	...	4	...	...	...	...	...	...	...	...	...	1	...	2	...	...	22
...	7	...	37	1	27	...	1	...	...	...	...	...	...	...	3	...	13	...	...	110
...	42	...	7	...	11	...	2	...	...	...	...	...	15	...	4	...	1	...	...	95
...	...	...	...	...	3	...	...	...	1	...	...	...	...	...	...	...	1	...	...	5
149	...	3	12	15	5	14	...	2	...	1	...	95	...	6	...	20	2	8	...	398

BOMBAY PRESI

	Provincial Headquarters—Hospitals and Dispensaries.												District Head			
	State public.		State special.		Local and Municipal Funds.		Private Aided.		*Private Non-Aided.		Railways.		State public.		State special.	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
I. M. S. Officers	5	...	2†	...	...	...	...	...	...	...	...	...	9	...	1	...
I. M. D. officers	8	...	...	...	...	...	...	...	...	...	2	...	3	...	...	...
Salaried Graduates (or Assistant Surgeons).	15	5	1	...	43	8	...	...	1	...	8	...	87	5	...	...
Salaried Licentiates (or Sub-Assistant Surgeons).	8	2	3	...	13	...	1	...	...	...	9	...	74	9	3	...
Honorary Graduates (or Assistant Surgeons).	61	6	...	...	27	1	...	...	14	1	...	...	27	1	...	...
Honorary Licentiates (or Sub Assistant Surgeons).	...	...	...	...	...	...	...	...	...	...	...	...	4	...	...	...
Nurses—																
(a) Europeans and Anglo-Indians	2	103	...	2	...	38	...	...	...	...	...	10	...	57	...	...
(b) Indians	...	101	...	9	...	88	...	...	...	3	...	...	5	63	...	...
Midwives	...	9	...	...	...	21	...	...	...	3	...	...	...	10	...	...
Dais	...	...	...	...	...	...	...	...	...	...	...	...	...	3	...	...
Compounders	25	...	4	...	34	...	1	...	3	...	16	...	59	...	1	...

* NOTE.—Complete information regarding the Medical Personnel in the case of private Non-aided insti
† R. A. M. C. Officers.

MADRAS

I. M. S. and I. M. D. Officers	6	...	2	...	...	...	...	...	...	...	...	...	15	...	...	...
Salaried Graduates or Assistant Surgeons.	55	7	3	...	...	...	1	...	...	...	6	...	117	10	...	...
Salaried Licentiates or Sub-Assistant Surgeons.	24	...	2	...	...	...	...	...	...	...	8	...	92	54	9	...
Honorary Graduates or Assistant Surgeons.	36	1	...	...	...	...	...	...	...	...	...	...	61	6	...	...
Honorary Licentiates or Sub-Assistant Surgeons.	9	2	...	...	...	...	...	...	...	...	...	...	48	5	...	...
Nurses—																
(a) Europeans and Anglo-Indians	...	122	...	...	...	2	...	...	...	1	...	...	...	147	...	...
(b) Indians	...	18	...	...	...	...	...	2	...	7	...	8	...	154	...	...
Midwives	...	...	...	...	...	...	...	...	...	...	...	...	...	88	...	...
Dais	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Compounders	34	...	2	...	46	...	1	...	...	...	10	...	173	17	6	2

NOTE.—I. M. S. and I. M. D. Officers employed in Jail Department, King Institute, Pasteur Institute, and

DENCY.

Quarters and other Urban Areas.								Rural Areas.												Total.
Local and Municipal Funds.		Private Aided.		* Private Non-Aided.		Railways.		State public.		State special.		Local and Municipal Funds.		Private Aided.		* Private Non-Aided.		Railways.		
M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	
...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	18
...	...	...	...	...	...	5	...	...	...	...	...	...	...	...	...	...	...	...	...	18
40	4	...	9	3	1	18	...	...	...	...	...	3	...	...	...	2	1	3	...	207
137	8	2	5	2	1	36	...	3	...	3	...	155	1	4	...	2	...	22	...	503
1	1	7	1	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	149
...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	5
...	1	...	18	...	1	...	9	...	...	...	...	...	...	...	...	...	2	...	6	249
...	39	...	20	1	15	...	3	...	1	...	...	...	9	...	...	...	2	...	...	359
...	46	...	22	...	1	...	...	...	...	...	...	...	7	...	...	...	2	...	...	121
...	18	...	15	...	1	...	1	...	...	...	...	...	8	...	...	...	1	...	1	48
189	1	10	1	2	3	44	...	2	...	...	...	161	...	3	...	4	1	16	...	580

tutions is not available.

PRESIDENCY.

1	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	25
9	2	5	2	14	9	7	...	16	...	12	...	19	...	14	...	19	5	1	...	333
174	18	6	4	6	7	25	...	35	17	53	6	321	13	326	1	40	13	23	...	1,277
1	...	...	...	3	...	...	...	10	...	...	...	14	1	2	1	1	2	1	...	140
2	...	...	1	7	1	...	...	2	...	2	...	...	...	...	...	2	...	...	...	81
...	...	...	3	...	10	...	...	...	164	...	2	...	...	2	...	11	...	...	...	464
...	...	...	...	...	...	...	...	...	12	...	...	...	...	6	...	9	...	...	...	216
...	241	...	8	...	66	...	3	...	51	...	29	...	304	...	127	...	32	...	...	949
...	...	...	...	...	6	...	...	...	...	...	...	...	2	...	...	...	2	...	...	10
189	12	3	15	29	4	10	...	69	...	51	...	308	...	29	2	42	16	...	9	1,079

in Bangalore are excluded.

Coo

	Provincial Headquarters—Hospitals and Dispensaries.												District Head			
	State public.		State special.		Local and Municipal Funds.		Private Aided.		Private Non-Aided.		Railways.		State public.		State special.	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
Salaried Graduates (or Assistant Surgeons).	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Salaried Licentiates (or Sub-Assistant Surgeons).	3	1	...	...	...	...	...	...	2	...	...	...	...	...	...	...
Honorary Graduates (or Assistant Surgeons).	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Honorary Licentiates (or Sub-Assistant Surgeons).	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Nurses—																
(a) Europeans and Anglo-Indians	...	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...
(b) Indians	...	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Midwives	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Dais	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Compounders	3	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...

As

	Provincial Headquarters—Hospitals and Dispensaries.														District Head			
	Administrative and District Medical Officers.		State public.		State special.		Local and Municipal Funds.		Private Aided.		Private Non-Aided.		Railways.		District and Subdivisional Medical Officers.		State public.	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
I. M. S. Officers	4	...	...	...	...	...	...	...	...	...	...	...	...	...	8	...	...	...
I. M. D. Officers	...	...	1	...	...	...	...	...	...	...	...	...	...	...	3	...	...	...
Salaried Graduates (or Assistant Surgeons).	1	...	1	...	...	...	...	...	...	...	...	...	...	...	31	...	6	...
Salaried Licentiates (or Sub-Assistant Surgeons).	...	...	4	1	...	...	...	...	...	...	...	...	...	...	...	...	18	2
Honorary Graduates (or Assistant Surgeons).	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Honorary Licentiates (or Sub-Assistant Surgeons).	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Nurses—																		
(a) Europeans and Anglo-Indians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	5
(b) Indians	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Midwives	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	5
Dais	...	...	...	2	...	...	...	...	...	...	...	...	...	...	...	...	...	1
Compounders	...	...	4	...	...	...	...	...	...	...	...	...	...	...	...	...	21	...

RG.

quarters and other Urban Areas.								Rural Areas.								Total.
Local and Municipal Funds.		Private Aided.		Private Non-Aided.		Railways.		State public.	State special.		Local and Municipal Funds.		Private Aided.		Private Non-Aided.		Railways.	
M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	
...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	1
...	...	...	...	...	...	...	...	2	...	...	...	9	...	...	...	...	...	...	...	17
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	3	...	...	...	...	...	...	...	...	...	...	...	4
...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	3
...	...	...	...	...	...	...	...	...	2	...	...	...	...	...	...	...	...	...	...	4
...	...	...	...	...	...	...	...	...	...	...	...	...	7	...	...	...	...	...	...	7
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	2	...	...	...	9	...	...	...	...	...	...	...	14

SAM.

quarters and other Urban Areas.										Rural Areas.												Total.
State special.		Local and Municipal Funds.		Private Aided.		Private Non-Aided.		Railways.		State public.		State special.		Local and Municipal Funds.		Private Aided.		Private Non-Aided.		Railways.		
M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	12
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	4
...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	2	...	1	...	43
11	...	16	11	1	...	1	...	3	...	29	...	8	...	139	...	2	...	12	...	4	...	262
...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1
...	...	...	...	...	...	3	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	5
...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	6
...	...	...	2	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	1	...	...	4
...	3	...	9	...	...	...	...	...	...	...	...	...	1	...	1	...	...	...	1	...	...	20
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2	...	...	5
23	...	47	...	...	...	4	1	1	...	19	1	5	...	136	...	2	...	6	...	11	...	281

	Provincial Headquarters—Hospitals and Dispensaries.												District			
	State public.		State special.		Local and Municipal Funds.		Private Aided.		Private Non-Aided.		Railways.		State public.		State special.	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
I. M. S. Officers	7	...	...	...	...	...	1	...	...	...	...	...	4	...	3	...
I. M. D. Officers	...	...	...	...	...	...	...	...	...	...	...	...	...	...	5	...
Salaried Graduates (or Assistant Surgeons).	9	2	...	...	2	...	...	6	...	...	2	...	10	1	...	...
Salaried Licentiates (or Sub-Assistant Surgeons).	7	...	1	...	2	...	...	2	...	...	1	...	20	2	6	...
Honorary Graduates (or Assistant Surgeons).	10	1	...	...	...	...	...	1	...	...	...	...	6	...	...	...
Honorary Licentiates (or Sub-Assistant Surgeons).	5	1	...	...	...	...	...	...	...	...	...	...	2	2	...	...
Nurses—																
(a) Europeans and Anglo-Indians	...	81	...	...	...	1	...	5	...	...	...	...	...	20	...	...
(b) Indians*	...	48	...	...	...	5	...	17	...	...	...	...	...	28	...	1
Midwives	...	...	...	...	...	3	...	...	...	...	...	...	...	1	...	...
Dais	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Compounders	10	2	1	...	2	...	3	...	...	...	3	...	17	2	9	...

* Burmese including other

DELHI

	Provincial Headquarters—Hospitals and Dispensaries.												Total.
	State public.		State special.		Local (District Board) and Municipal Funds.		Private Aided.		Private Non-Aided.		Railways		
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	
I. M. S Officers	2	...	...	...	...	...	...	...	...	...	...	...	2
W. M. S. Officers	...	...	...	...	...	...	...	11	...	...	...	...	11
I. M. D. Officers	2	...	1	...	...	...	...	...	...	...	...	...	3
Salaried Graduates (or Assistant Surgeons)	1	...	...	...	3	...	...	16	...	...	1	...	21
Salaried Licentiates (or Sub-Assistant Surgeons)	...	...	1	...	19	1	...	13	...	...	3	...	37
Honorary Graduates (or Assistant Surgeons)	...	...	...	...	...	...	...	...	...	...	...	...	...
Honorary Licentiates (or Sub-Assistant Surgeons	...	...	...	...	...	...	1	...	..	...	...	...	1
Nurses—													
(a) Europeans and Anglo-Indians	...	4	...	...	...	11	...	15	...	...	...	2	32
(b) Indians	...	...	...	...	...	6	...	88	...	...	...	2	96
Midwives	...	...	...	...	...	...	...	10	...	...	...	...	10
Dais	...	...	...	...	...	1	...	5	...	...	...	...	6
Compounders	4	...	2	...	67	3	1	10	...	...	3	...	90

MA.

Headquarters and other Urban Areas.								Rural Areas.												Total.
Local and Municipal Funds.		Private Aided.		Private Non-Aided.		Railways.		State public.		State special.		Local and Municipal Funds.		Private Aided.		Private Non-Aided.		Railways.		
M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	
8	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	23
8	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	14
31	1	...	...	...	...	4	...	2	...	...	...	4	...	1	...	1	...	...	...	76
114	...	1	...	6	1	15	...	37	...	17	...	93	...	...	...	12	1	16	...	354
...	...	2	...	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	22
...	...	...	...	6	...	...	...	...	...	...	...	...	...	...	...	3	...	...	...	19
...	24	...	...	...	2	...	...	...	...	...	...	...	...	...	...	2	...	...	...	135
...	60	...	1	...	4	...	1	...	5	...	...	...	24	...	...	...	14	...	...	208
...	64	...	16	...	7	...	...	...	2	...	...	...	68	...	...	...	...	...	...	161
...	...	...	...	...	9	...	...	...	...	...	...	...	...	...	...	...	4	...	...	13
997	...	...	...	1	1	19	...	28	...	9	...	82	...	...	...	12	1	16	...	315

indigenous races.

Appendix VIII

relating to

Section X (Jails).

TABLE A.—SICKNESS

Statistics by

Administrations.*	Average strength.	Constantly sick.	Cholera. A.	Cholera. D.	Small-pox. A.	Small-pox. D.	Malaria. A.	Malaria. D.
India (excluding Andamans)	145,437	22	...	...	0·4	...	172	0·6
	156,152	23	0·2	...	0·6	...	155	0·5
	129,312	*23*	*0·2*	*0·1*	*0·5*	...	*174*	*0·6*
Andamans	6,623	27	...	...	0·3	...	245	2·7
	7,423	27	...	...	...	...	243	5·1
	7,824	*34*	...	...	...	...	*319*	*4·8*
India (including Andamans)	152,060	22	...	...	0·4	...	175	0·7
	163,575	23	0·2	...	0·5	...	159	0·7
	137,136	*24*	*0·1*	*0·1*	*0·4*	...	*182*	*0·9*
N.-W. F. P.	6,927	35	...	...	0·7	...	258	0·4
	7,964	32	...	...	...	...	270	0·4
	4,451	*31*	...	...	*0·1*	...	*307*	*0·9*
Punjab	20,428	23	...	...	0·2	...	315	0·8
	21,012	22	0·3	0·1	0·2	...	270	0·5
	18,677	*30*	*0·2*	*0·1*	*0·2*	...	*379*	*1·3*
U. P.	33,346	20	...	...	0·6	...	128	0·3
	36,703	21	0·2	...	0·8	...	143	0·4
	31,097	*20*	*0·1*	...	*0·7*	...	*160*	*0·4*
B. & O.	11,469	25	...	...	0·4	0·1	68	0·5
	12,012	33	0·5	0·2	1·3	0·1	143	0·5
	7,499	*28*	*0·3*	*0·2*	*1·1*	*0·1*	*120*	*0·4*
Bengal	16,656	37	0·1	...	0·4	...	334	1·2
	16,331	38	0·3	0·1	0·9	0·1	277	1·0
	13,184	*35*	*0·2*	...	*0·4*	*0·1*	*266*	*1·2*
C. P.	4,308	10	...	...	0·2	...	43	0·5
	4,980	11	...	...	0·4	...	59	1·2
	4,132	*11*	*0·2*	*0·1*	*0·2*	...	*45*	*0·5*
Bombay	13,695	22	...	...	0·4	...	298	0·5
	16,428	19	...	...	0·1	...	150	0·2
	11,855	*21*	*0·1*	...	*0·3*	...	*217*	*0·3*
Madras	11,758	17	...	...	0·1	...	22	0·2
	13,257	18	...	...	0·2	...	13	...
	15,442	*16*	...	...	*0·2*	...	*24*	*0·2*
Assam	3,805	26	...	...	...	...	131	0·8
	3,809	28	...	...	...	...	168	0·5
	2,431	*33*	*0·1*	...	*0·1*	...	*114*	*0·9*
Burma	20,895	11	...	...	0·3	...	19	0·6
	21,434	11	...	...	0·6	0·1	22	0·5
	18,965	*17*	*0·2*	*0·1*	*0·3*	*0·1*	*40*	*0·5*

A = Admissions.

D = Deaths.

NOTE.—The three figures against each administrative group
The rates have been calculated *per mille*

* Excluding subsidiary jails.

AND MORTALITY.

Administrations.

Tubercle of the lungs.		Pneumonia.		Respiratory diseases.		Dysentery.		Diarrhœa.		Anæmia and debility.		All causes.	
A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.
6	1·7	10	2·3	30	0·4	35	0·8	20	0·2	8	0·3	560	11
6	1·7	13	2·6	33	0·4	45	0·7	23	0·2	8	0·2	603	11
8	*2·4*	*12*	*2·5*	*28*	*0·5*	*36*	*1·2*	*22*	*0·3*	*8*	*0·3*	*606*	*13*
5	2·1	6	1·2	23	0·6	25	2·0	6	0·2	12	2·4	552	17
2	1·3	8	3·0	15	0·7	9	1·2	5	0·3	10	3·2	521	23
4	*1·8*	*7*	*2·8*	*27*	*0·6*	*32*	*4·8*	*14*	*0·2*	*7*	*1·5*	*690*	*26*
6	1·7	10	2·2	30	0·4	35	0·8	19	0·2	8	0·4	560	12
6	0·6	13	2·6	32	0·4	43	0·7	22	0·2	8	0·4	600	11
7	*2·3*	*11*	*2·5*	*28*	*0·5*	*36*	*1·4*	*21*	*0·3*	*8*	*0·4*	*611*	*14*
8	2·2	21	3·3	66	0·4	17	0·6	10	0·3	11	...	642	12
5	2·0	44	6·3	94	0·1	15	0·1	8	...	7	...	730	12
11	*3·2*	*26*	*4·9*	*53*	*0·8*	*18*	*0·3*	*15*	*0·1*	*5*	*0·1*	*709*	*16*
10	1·1	10	2·7	40	0·4	40	1·0	18	0·6	8	0·3	746	15
5	2·1	14	4·3	48	0·4	34	0·8	21	0·5	13	0·2	802	13
5	*2·6*	*15*	*3·7*	*44*	*0·6*	*15*	*0·3*	*21*	*0·6*	*14*	*0·3*	*867*	*14*
4	1·3	9	1·6	26	0·4	15	0·1	13	0·2	6	0·2	474	7
7	1·2	13	2·7	28	0·4	22	0·6	16	0·2	7	0·2	539	9
8	*1·6*	*13*	*2·7*	*23*	*0·5*	*19*	*0·6*	*13*	*0·2*	*5*	*0·2*	*482*	*10*
6	2·6	17	3·4	44	0·6	53	1·8	45	0·1	2	0·2	462	15
8	2·7	16	2·5	40	0·3	143	1·2	55	0·2	1	...	675	13
7	*2·6*	*11*	*2·1*	*33*	*0·4*	*77*	*1·8*	*62*	*0·3*	*3*	*0·2*	*566*	*14*
5	1·4	12	3·0	39	0·1	65	1·1	56	0·2	20	0·7	1,094	12
6	1·5	12	2·0	36	1·0	59	0·9	58	0·2	18	0·2	1,101	13
8	*2·1*	*11*	*2·0*	*31*	*0·5*	*59*	*1·6*	*66*	*0·3*	*15*	*0·3*	*999*	*14*
8	2·1	8	2·3	14	0·7	24	0·7	13	0·5	5	0·5	277	10
9	1·0	7	1·0	20	0·8	40	1·0	24	0·2	3	0·2	344	8
7	*1·6*	*9*	*2·0*	*16*	*1·0*	*52*	*1·2*	*14*	*0·4*	*3*	*0·2*	*297*	*12*
3	1·2	13	2·7	32	0·3	43	0·1	26	0·2	10	0·3	666	11
3	0·7	14	1·9	30	0·4	59	0·2	34	0·1	8	0·1	536	7
4	*1·3*	*17*	*3·0*	*37*	*0·4*	*47*	*0·4*	*30*	*0·3*	*5*	*0·2*	*627*	*10*
5	2·0	4	0·4	11	0·4	39	1·3	2	0·2	9	0·3	290	11
7	1·4	4	...	14	0·2	45	0·5	2	0·1	8	0·3	306	8
11	*3·0*	*6*	*1·4*	*15*	*0·3*	*43*	*1·7*	*1*	*0·1*	*5*	*0·4*	*278*	*13*
										4			
11	2·6	15	3·2	53	0·5	134	1·6	22	...	14	1·6	561	16
9	3·4	11	3·9	43	...	112	3·9	28	0·3	12	1·0	602	19
12	*5·0*	*13*	*3·6*	*48*	*0·6*	*94*	*3·7*	*37*	*0·5*	*11*	*0·8*	*660*	*22*
4	2·2	6	1·7	7	0·2	15	0·8	2	...	3	0·2	239	11
5	2·3	5	1·5	9	0·4	18	1·1	2	...	4	0·5	315	11
8	*3·5*	*5*	*1·6*	*12*	*0·3*	*34*	*2·8*	*5*	*0·2*	*6*	*0·5*	*596*	*17*

are those for (1) 1933, (2) 1932 and (3) 1923—32.
of average population.

TABLE B.—SICKNESS

Statistics by

Groups.*	Average strength.	Constantly sick.	Influenza. A.	Influenza. D.	Cholera. A.	Cholera. D.	Smallpox. A.	Smallpox. D.
India (excluding Andamans)	145,437	22	31	0·1	...	...	0·4	...
	156,152	23	35	0·2	0·2	...	0·6	...
	129,312	*23*	*28*	*0·2*	*0·2*	*0·1*	*0·4*	...
Andamans	6,623	27	14	...	...	...	0·3	...
	7,423	27	3	...	...	...	...	...
	7,824	*34*	*3*	*0·1*	...	...	...	...
India (including Andamans)	152,060	22	30	0·1	...	...	0·4	...
	163,575	23	34	0·2	0·2	...	0·5	...
	137,136	*24*	*26*	*0·2*	*0·1*	*0·1*	*0·4*	...
Group I.—Burma Coast and Bay Islands	14,700	10	19	...	...	...	0·3	...
	14,339	12	28	0·1	...	...	0·4	0·1
	12,937	*17*	*33*	...	*0·1*	...	*0·2*	...
Group II.—Burma Inland	6,195	13	11	...	...	...	0·3	0·2
	7,095	9	11	0·3	...	...	1·0	...
	6,027	*16*	*8*	*0·1*	*0·5*	*0·3*	*0·5*	*0·1*
Group III.—Assam	3,678	26	24	1·1	...	...	...	...
	3,691	28	46	0·3	...	...	...	...
	2,339	*33*	*56*	*0·4*	*0·1*	...	*0·1*	...
Group IV.—Bengal & Orissa	17,559	37	101	0·3	0·1	...	0·3	...
	17,279	37	106	0·4	0·3	0·1	0·9	0·1
	13,753	*35*	*63*	*0·3*	...	...	*0·5*	*0·1*
Group V.—Gangetic Plain and Chota Nagpur.	32,423	23	31	0·2	...	...	0·7	...
	35,318	27	28	0·2	0·3	0·1	1·1	...
	26,942	*23*	*28*	*0·3*	*0·2*	...	*0·8*	...
Group VI.—Upper Sub-Himalaya	19,405	19	7	...	...	...	0·1	...
	20,826	21	17	0·1	0·4	0·1	0·4	...
	18,788	*23*	*16*	*0·2*	*0·3*	*0·2*	*0·4*	...
Group VII.—North-West Frontier, Indus Valley and North-Western Rajputana.	20,106	29	3	...	...	...	0·5	...
	21,338	24	11	0·2	...	...	0·1	...
	15,728	*31*	*20*	*0·2*	...	...	*0·2*	...
Group VIII.—South Western Rajputana, Central India & Gujarat.	5,584	12	24	...	0·5	...	...	...
	5,864	11	76	0·2	0·3	...	...	...
	5,165	*14*	*26*	*0·1*	*0·1*	...	*0·2*	...
Group IX.—Deccan	11,139	17	24	...	...	...	0·1	...
	13,841	16	13	0·1	...	...	0·3	...
	9,562	*17*	*16*	*0·1*	*0·2*	*0·1*	*0·2*	...
Group X.—Western Coast	2,553	18	20	...	...	...	1·2	...
	3,035	18	26	...	...	...	0·3	...
	2,751	*18*	*18*	*0·1*	*0·1*	...	*0·1*	...
Group XI.—Southern India	10,863	17	61	0·1	...	...	...	...
	12,233	19	60	0·3	...	...	0·2	0·1
	14,346	*17*	*27*	*0·1*	...	...	*0·2*	...
Group XII.—Hills	1,171	49	28	0·9	...	...	...	...
	1,206	34	52	...	...	...	...	...
	887	*33*	*36*	*0·4*	...	...	*0·3*	...

A = Admissions.
D = Deaths.

NOTE.—The three figures opposite each administrative group The rates have been calculated *per mille*

* Excluding subsidiary jails.

AND MORTALITY.

Groups.

Enteric fever.		Malaria.		Pyrexia of uncertain origin.		Pneumonia.		Dysentery.		Diarrhœa.		All causes.	
A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.
2	0·3	172	0·6	9	...	10	2·3	35	0·8	20	0·2	560	11
3	0·3	155	0·5	14	0·1	13	2·6	45	0·7	23	0·2	603	11
2	*0·3*	*174*	*0·6*	*11*	...	*12*	*2·5*	*36*	*1·2*	*22*	*0·3*	*606*	*13*
1	...	245	2·7	...	...	6	1·2	25	2·0	6	0·2	552	18
2	0·4	243	5·1	...	...	8	3·0	9	1·2	5	0·3	521	23
1	*0·1*	*319*	*4·8*	...	...	*7*	*2·8*	*32*	*4·8*	*14*	*0·2*	*690*	*26*
2	0·2	175	0·7	9	...	10	2·2	35	0·8	19	0·2	560	12
3	0·3	159	0·7	13	...	13	2·6	43	0·7	22	0·2	600	11
2	*0·3*	*182*	*0·9*	*11*	...	*11*	*2·5*	*36*	*1·4*	*21*	*0·3*	*611*	*14*
1	0·2	14	0·3	9	0·1	5	1·2	14	0·9	2	0·1	222	10
2	0·4	16	0·4	18	0·1	4	1·4	17	1·3	1	...	311	10
4	*0·5*	*39*	*0·3*	*24*	...	*5*	*1·4*	*35*	*2·7*	*5*	*0·2*	*667*	*15*
2	0·3	29	1·3	5	...	10	2·9	16	0·5	1	...	282	13
2	0·5	34	0·7	12	...	6	1·7	20	0·7	3	0·1	323	13
2	*0·6*	*43*	*0·9*	*13*	...	*7*	*1·9*	*30*	*3·0*	*5*	*0·3*	*441*	*19*
1	...	130	0·8	1	...	15	3·3	134	1·4	18	...	542	16
1	0·3	160	0·8	4	0·6	10	4·1	115	4·1	28	0·3	584	19
1	*0·2*	*113*	*0·9*	*20*	*0·1*	*13*	*3·7*	*96*	*3·8*	*36*	*0·4*	*652*	*22*
1	0·5	328	1·1	18	...	13	3·2	64	1·2	54	0·2	1,072	13
3	0·2	273	1·0	29	...	12	2·0	59	0·8	59	0·2	1,077	14
2	*0·4*	*260*	*1·2*	*31*	...	*11*	*2·1*	*59*	*1·7*	*65*	*0·3*	*946*	*17*
3	0·2	92	0·4	10	...	10	2·2	27	0·6	24	0·2	468	9
3	0·4	146	0·5	14	0·1	14	2·3	62	0·7	28	0·2	594	11
1	*0·2*	*144*	*0·4*	*5*	...	*12*	*2·4*	*34*	*0·9*	*25*	*0·3*	*490*	*11*
2	0·2	287	0·6	8	0·1	11	2·4	32	0·9	18	0·5	695	12
2	0·2	258	0·2	19	...	15	4·3	29	0·4	18	0·2	766	10
1	*0·2*	*340*	*1·0*	*8*	...	*17*	*3·9*	*19*	*0·6*	*17*	*0·4*	*780*	*11*
6	0·6	304	0·8	16	...	18	3·7	34	0·5	15	0·4	710	15
4	0·3	244	0·6	8	...	28	4·8	31	0·2	17	0·3	692	12
4	*0·4*	*297*	*1·0*	*11*	...	*23*	*4·1*	*20*	*0·3*	*18*	*0·4*	*754*	*16*
3	0·2	132	0·2	2	0·2	12	1·6	13	0·2	7	...	331	6
3	0·3	106	0·3	3	...	13	3·2	27	0·9	14	0·3	411	10
1	*0·2*	*155*	*0·4*	*1*	...	*11*	*2·5*	*19*	*0·7*	*18*	*0·3*	*447*	*9*
1	...	198	0·3	6	...	6	1·4	29	0·4	25	0·2	516	8
3	0·3	101	0·6	15	...	6	0·6	58	0·5	37	0·1	344	8
1	*0·2*	*117*	*0·3*	*8*	...	*6*	*1·3*	*53*	*0·7*	*25*	*0·4*	*451*	*9*
3	...	106	...	2	...	2	...	86	1·2	24	...	537	7
3	...	92	...	...	...	5	1·3	89	1·3	29	...	492	7
3	*0·3*	*171*	*0·3*	*1*	...	*7*	*2·1*	*55*	*1·2*	*31*	*0·3*	*518*	*12*
2	...	23	0·2	1	...	4	0·5	33	1·2	2	0·2	282	11
11	0·1	14	...	4	...	4	1·4	39	0·3	2	0·1	306	8
2	*0·3*	*26*	*0·2*	*1*	...	*6*	*1·3*	*44*	*1·7*	*2*	*0·1*	*286*	*12*
...	...	227	0·9	3	...	10	1·7	24	0·9	23	0·9	565	18
2	...	226	...	24	...	12	...	37	...	11	0·8	570	13
3	*0·6*	*185*	*0·4*	*40*	*0·1*	*23*	*3·2*	*37*	*0·4*	*32*	*0·4*	*701*	*17*

are those for (1) 1933, (2) 1932 and (3) 1923—32.
of average population.

TABLE C.—CAUSES OF ADMISSION.*

	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total.
Cholera	1	2	...	...	...	1	...	...	1	...	...	...	5
	1	...	2	2	1	2	7	7	1	1	2	...	26
	...	...	*2*	*2*	*2*	*1*	*2*	*6*	*1*	*1*	*1*	...	*18*
Smallpox	7	6	9	9	7	5	2	2	1	...	4	2	54
						Not available.							86
						Not available.							*48*
Dysentery	277	282	362	322	377	405	501	550	535	567	521	422	5,121
	333	339	512	657	632	514	810	909	831	574	530	372	7,013
	288	*239*	*297*	*363*	*386*	*393*	*622*	*765*	*657*	*531*	*435*	*371*	*5,347*
Diarrhœa	160	186	291	214	253	262	303	320	233	255	248	173	2,898
	201	259	344	351	292	339	424	433	331	243	224	146	3,587
	141	*148*	*249*	*238*	*226*	*244*	*334*	*364*	*254*	*208*	*183*	*163*	*2,752*
Enteric fever	19	18	25	42	37	37	28	35	37	26	20	7	331
	5	14	32	33	55	22	42	59	79	52	32	17	442
	12	*15*	*23*	*28*	*31*	*24*	*33*	*40*	*40*	*34*	*25*	*16*	*321*
Malaria	1,223	920	1,303	1,350	1,419	1,466	1,937	2,313	2,861	4,349	3,578	2,299	25,018
	1,455	1,287	1,627	1,802	1,863	1,842	2,096	2,462	2,602	2,909	2,530	1,775	24,250
	1,240	*974*	*1,072*	*1,187*	*1,283*	*1,330*	*1,754*	*2,263*	*2,782*	*3,405*	*2,930*	*1,866*	*22,086*
Pyrexia of uncertain origin.	88	90	104	146	120	86	115	120	170	128	99	77	1,343
	152	*113*	*218*	*180*	*243*	202	*219*	*234*	*221*	*170*	*123*	*76*	*2,151*
	87	*64*	*104*	*105*	*118*	*157*	*194*	*176*	*151*	*151*	*120*	*82*	*1,509*
Pneumonia	205	119	126	113	100	78	101	88	87	122	173	192	1,504
						Not available.							2,001
						Not available.							*1,609*
Tubercle of the lungs	70	73	57	66	76	64	67	130	69	50	46	47	815
						Not available.							922
						Not available.							*1,017*

NOTE.—The three figures shown against each disease are those for (1) 1933, (2) 1932 and (3) mean of 1928—32.

* Excluding Andamans.

TABLE D.—*SICKNESS AND MORTALITY FROM PRINCIPAL DISEASES.

Year.	Average annual strength.	Influenza. Actuals. A.	Influenza. Actuals. D.	Influenza. Rates. A.	Influenza. Rates. D.	Cholera. Actuals. A.	Cholera. Actuals. D.	Cholera. Rates. A.	Cholera. Rates. D.	Smallpox. Actuals. A.	Smallpox. Actuals. D.	Smallpox. Rates. A.	Smallpox. Rates. D.	Enteric fever. Actuals. A.	Enteric fever. Actuals. D.	Enteric fever. Rates. A.	Enteric fever. Rates. D.
1933 . . .	145,437	4,536	18	31	0·1	5	...	...	...	54	2	0·4	...	381	38	2	0·3
1932 . . .	156,152	5,534	29	35	0·2	26	7	0·2	...	86	5	0·6	...	442	46	3	0·3
Mean 1928—32 .	*137,989*	*4,961*	*30*	*36*	*0·2*	*18*	*6*	*0·1*	...	*48*	*4*	*0·4*	...	*321*	*44*	*2*	*0·3*

Year.	Average annual strength.	Malaria. Actuals. A.	Malaria. Actuals. D.	Malaria. Rates. A.	Malaria. Rates. D.	Pyrexia of uncertain origin. Actuals. A.	Pyrexia of uncertain origin. Actuals. D.	Pyrexia of uncertain origin. Rates. A.	Pyrexia of uncertain origin. Rates. D.	Tubercle of the lungs. Actuals. A.	Tubercle of the lungs. Actuals. D.	Tubercle of the lungs. Rates. A.	Tubercle of the lungs. Rates. D.	Pneumonia. Actuals. A.	Pneumonia. Actuals. D.	Pneumonia. Rates. A.	Pneumonia. Rates. D.
1933 . . .	145,437	25,018	83	172	0·6	1,343	4	9	...	815	241	6	1·7	1,504	328	10	2
1932 . . .	156,152	24,250	74	155	0·5	2,151	8	14	0·1	922	259	6	1·7	2,001	406	13	3
Mean 1928—32 .	*137,989*	*22,125*	*74*	*160*	*0·5*	*1,509*	*5*	*11*	...	*1,017*	*309*	*7*	*2·2*	*1,609*	*348*	*12*	*3*

Year.	Average annual strength.	Respiratory Diseases. Actuals. A.	Respiratory Diseases. Actuals. D.	Respiratory Diseases. Rates. A.	Respiratory Diseases. Rates. D.	Dysentery. Actuals. A.	Dysentery. Actuals. D.	Dysentery. Rates. A.	Dysentery. Rates. D.	Diarrhœa. Actuals. A.	Diarrhœa. Actuals. D.	Diarrhœa. Rates. A.	Diarrhœa. Rates. D.	Anæmia and Debility. Actuals. A.	Anæmia and Debility. Actuals. D.	Anæmia and Debility. Rates. A.	Anæmia and Debility. Rates. D.
1933 . . .	145,437	4,357	53	30	0·4	5,121	111	35	0·8	2,898	34	20	0·2	1,179	50	8	0·3
1932 . . .	156,152	5,085	65	33	0·4	7,013	111	45	0·7	3,587	30	23	0·2	1,290	37	8	0·2
Mean 1928—32 .	*137,989*	*3,909*	*63*	*28*	*0·5*	*5,353*	*164*	*39*	*1·2*	*2,753*	*37*	*20*	*0·3*	*1,235*	*48*	*9*	*0·3*

NOTE.—Rates have been calculated *per mille* of average population. * Excluding Andamans. A = Admissions. D = Deaths.

TABLE E.—SICKNESS STATISTICS OF CONVICTS ONLY.

		1929			1930			1931			1932			1933		
		Average population.	Rate per 1,000.		Average population.	Rate per 1,000.		Average population.	Rate per 1,000.		Average population.	Rate per 1,000.		Average population.	Rate per 1,000.	
			A.	D.		A.	D.		A.	D.		A.	D.		A.	D.
Total	C.	64,036	498	15	64,554	576	13	66,066	506	12	76,799	482	10	71,222	434	11
	D.	51,045	611	14	63,097	667	12	40,199	680	14	58,752	737	12	53,671	801	12
N.-W. F. P.	C.	3,519	372	12	3,764	605	18	3,959	439	8	6,359	734	11	5,538	687	11
	D.	618	853	15	572	902	21	637	730	41	630	797	18	670	457	22
Punjab	C.	8,169	926	14	8,359	975	13	9,051	828	15	9,558	722	17	8,943	679	17
	D.	8,622	879	16	8,635	1,032	16	7,865	1,143	13	8,519	962	10	8,614	934	16
U. P.	C.	12,351	295	6	11,789	241	4	12,189	360	8	13,115	356	8	12,477	318	5
	D.	15,582	437	9	16,417	562	8	14,246	675	13	17,939	675	10	16,042	577	7
B. & O.	C.	4,269	312	17	4,784	246	20	4,876	337	24	5,230	257	12	5,866	211	15
	D.	2,576	563	17	6,222	667	8	3,952	818	16	5,753	1,098	14	4,739	771	17
Bengal	C.	6,412	662	12	7,111	900	9	6,891	872	11	7,399	1,017	12	7,551	909	12
	D.	4,991	1,092	14	9,051	958	11	5,449	1,089	15	5,968	1,222	14	6,295	1,286	14
C. P.	C.	1,834	151	11	2,111	421	9	2,058	180	12	2,214	265	6	1,830	104	6
	D.	1,963	286	18	2,295	418	9	1,682	599	23	2,289	426	8	1,992	437	16
Bombay	C.	5,766	617	10	7,776	724	9	6,546	590	8	8,755	519	6	7,001	511	11
	D.	4,880	738	12	6,686	604	10	5,143	560	16	6,725	585	9	5,827	887	12
Madras	C.	10,203	251	12	10,427	605	18	9,372	373	10	10,018	273	8	8,849	271	12
	D.	2,823	439	8	3,343	902	21	11,669	396	10	2,306	447	11	2,045	367	7
Assam	C.	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	D.	1,992	584	19	2,370	536	16	2,606	630	22	3,140	596	21	3,143	551	18
Burma	C.	11,513	640	33	10,433	555	21	11,124	397	13	14,151	364	11	13,167	214	12
	D.	6,998	399	22	7,506	375	16	5,875	243	12	5,483	262	15	4,304	273	12

C = Central Jails.
D = District Jails.

A = Admission Rates.
D = Death Rates.

TABLE F.—SICKNESS STATISTICS OF CONVICTS ONLY ARRANGED ACCORDING TO DURATION OF CONFINEMENT.

			Not exceeding six months.	Above six months and not exceeding one year.	Above one year and not exceeding two years.	Above two years and not exceeding three years.	Above three years and not exceeding seven years.	Above seven years.	Total.
1929	District Jails	Average Popn.	21,010	11,824	8,640	5,398	3,859	1,115	51,846
		Deaths	302	126	119	59	82	25	713
		Rate per 1,000	14	11	14	11	21	22	14
	Central Jails	Average Popn.	14,287	11,632	11,108	9,278	9,262	8,438	64,005
		Deaths	180	145	183	135	230	93	966
		Rate per 1,000	13	13	17	15	25	11	15
1930	District Jails	Average Popn.	30,071	12,642	9,224	5,353	3,430	1,227	61,947
		Deaths	308	127	128	60	68	36	727
		Rate per 1,000	10	10	14	11	20	29	12
	Central Jails	Average Popn.	17,179	12,116	11,403	8,911	8,815	9,085	67,509
		Deaths	224	114	154	106	170	100	868
		Rate per 1,000	13	9	14	12	19	11	13
1931	District Jails	Average Popn.	21,990	11,453	8,166	5,174	2,837	1,106	50,726
		Deaths	338	147	124	44	57	21	731
		Rate per 1,000	15	13	15	9	20	18	14
	Central Jails	Average Popn.	15,092	11,604	10,587	8,834	8,917	8,762	63,796
		Deaths	229	106	132	80	142	83	772
		Rate per 1,000	15	9	13	9	16	10	12
1932	District Jails	Average Popn.	26,794	13,931	8,277	4,822	2,774	1,093	57,691
		Deaths	335	136	91	44	48	25	679
		Rate per 1,000	13	10	11	9	17	23	12
	Central Jails	Average Popn.	19,316	13,891	11,898	10,503	9,900	9,381	74,889
		Deaths	234	138	133	76	111	74	766
		Rate per 1,000	12	10	11	7	11	8	10
1933	District Jails	Average Popn.	21,188	13,762	8,601	5,164	2,984	1,007	52,706
		Deaths	295	153	104	50	42	16	660
		Rate per 1,000	14	11	12	10	14	16	13
	Central Jails	Average Popn.	14,424	11,394	12,278	10,067	9,444	9,343	66,950
		Deaths	222	128	158	72	143	75	798
		Rate per 1,000	13	11	13	7	15	8	11

TABLE G.—ADMISSION AND DEATH RATES *PER MILLE* OF AVERAGE STRENGTH.

	N.-W. F. P.	Punjab.	U. P.	B. & O.	Bengal.	C. P.	Bombay.	Madras.	Assam.	Burma.	India.*	Andamans.	India.†
I.—Average Annual Strength.	6,927	20,428	33,346	11,469	16,656	4,808	13,695	11,758	3,805	20,895	145,437	6,628	152,060
II.—Constantly Sick Rate—													
(*a*) Excluding subsidiary jails and lock-ups.	35	23	20	25	37	10	22	17	26	11	22	27	22
(*b*) Including subsidiary jails and lock-ups.	34	23	20	24	36	10	20	15	26	11	22	27	22
III.—Admission Rate—													
All causes—													
(*a*) Excluding subsidiary jails and lock-ups.	**642**	**746**	**474**	**462**	**1,094**	**277**	**666**	**290**	**561**	**239**	**560**	**552**	**560**
(*b*) Including subsidiary jails and lock-ups.	**632**	**761**	**474**	**509**	**1,126**	**273**	**702**	**337**	**561**	**238**	**590**	**552**	**588**
Influenza	6	3	28	23	107	52	3	60	28	17	31	14	30
Cholera	...	...	...	...	...	...	...	...	...	...	...	...	...
Smallpox	1	...	1	...	...	...	...	...	...	...	...	...	...
Enteric fever	6	4	2	4	1	1	2	2	1	1	2	1	2
Malaria	258	315	128	68	334	43	298	22	131	19	172	245	175
Sandfly fever	1	27	3	...	1	...	...	...	...	...	5	...	4
Pyrexia of uncertain origin.	3	19	10	3	19	12	1	...	1	8	9	...	9
Tubercle of the lungs	8	10	4	6	5	8	3	5	11	4	6	5	6
Pneumonia	21	10	9	17	12	8	13	4	15	6	10	6	10
Respiratory diseases	66	40	26	44	39	14	32	11	53	7	30	23	30
Dysentery	17	40	15	53	65	24	43	39	134	15	35	25	35
Diarrhœa	10	18	13	45	56	13	26	2	22	2	20	6	19
Spleen diseases	2	1	1	...	...	1	1	...	...	...	1	1	1
Scurvy	...	...	...	...	...	1	...	...	...	...	...	...	...
Anæmia and Debility	11	8	6	2	20	5	10	9	14	3	8	12	8
Abscess, ulcer and boil	45	47	51	14	57	14	26	6	22	11	34	27	34
IV.—Death Rate—													
All causes—													
(*a*) Excluding subsidiary jails and lock-ups.	**12**	**15**	**7**	**15**	**12**	**10**	**11**	**11**	**16**	**11**	**11**	**18**	**12**
(*b*) Including subsidiary jails and lock-ups.	**12**	**14**	**7**	**15**	**11**	**9**	**11**	**10**	**16**	**11**	**11**	**18**	**11**
Cholera	...	...	...	...	...	...	...	...	...	...	...	...	...
Smallpox	...	...	...	...	...	...	...	...	...	...	...	...	...
Enteric fever	...	...	...	...	...	...	...	...	...	...	...	...	...
Malaria	...	1	...	1	1	1	1	...	1	1	1	3	1
Sandfly fever	...	...	...	...	...	...	...	...	...	...	...	...	...
Pyrexia of uncertain origin.	...	...	...	...	...	...	...	...	...	...	...	...	...
Tubercle of the lungs	2	1	1	3	1	2	1	2	3	2	2	2	2
Pneumonia	3	3	2	3	3	2	3	...	3	2	2	1	2
Respiratory diseases	...	...	...	1	...	1	...	...	1	...	...	1	...
Dysentery	1	1	...	2	1	1	...	1	2	1	1	2	1
Diarrhœa	...	1	...	...	...	1	...	...	...	...	...	...	...
Hepatic abscess	...	...	...	...	...	...	...	...	...	...	...	...	...
Anæmia and Debility	...	...	...	...	1	1	...	...	2	...	...	2	...
Phagadæna, Slough and Gangrene.	...	...	...	...	...	...	...	...	...	...	...	...	...

*Excluding Andamans.

†Including Andamans.

TABLE H.—ADMISSIONS FROM CHOLERA, SMALLPOX, ENTERIC FEVER, MALARIA, PYREXIA OF UNCERTAIN ORIGIN, TUBERCULOSIS OF THE LUNGS, PNEUMONIA, DYSENTERY AND DIARRHŒA BY MONTHS.

CHOLERA.

	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.
India	1	2	...	...	...	1	...	...	1	...	...	...	5
N.-W. F. P.	...	...	...	...	...	...	...	...	...	...	...	...	...
Punjab	...	...	...	...	...	...	...	...	...	...	...	...	...
U. P.	...	...	...	...	...	...	...	...	...	...	...	...	...
B. & O.	...	...	...	...	...	...	...	...	...	...	...	...	...
Bengal	...	1	...	...	...	...	...	...	1	...	...	...	2
C. P.	...	...	...	...	...	...	...	...	...	...	...	...	...
Bombay	...	...	...	...	...	...	...	...	...	...	...	...	...
Madras	...	...	...	...	...	...	...	...	...	...	...	...	...
Assam	...	...	...	...	...	...	...	...	...	...	...	...	...
Burma	...	...	...	...	...	...	...	...	...	...	...	...	...
Andamans	...	...	...	...	...	...	...	...	...	...	...	...	...

SMALLPOX.

India	7	6	9	9	7	5	2	2	3	...	4	2	56
N.-W. F. P.	...	...	...	1	...	...	1	...	1	...	2	...	5
Punjab	2	1	...	...	...	1	...	...	...	...	...	...	4
U. P.	...	1	6	3	4	3	...	...	...	...	1	1	19
B. & O.	...	...	...	3	...	...	1	...	...	...	...	1	5
Bengal	1	1	2	1	...	...	...	...	...	...	1	...	6
C. P.	...	...	...	...	1	...	...	...	...	...	...	...	1
Bombay	4	1	...	...	1	...	...	...	...	...	...	...	6
Madras	...	...	1	...	...	...	...	...	...	...	...	...	1
Assam	...	...	...	...	...	...	...	...	...	...	...	...	...
Burma	...	2	...	1	1	1	...	2	...	...	...	...	7
Andamans	...	...	...	...	...	...	...	...	2	...	...	...	2

ENTERIC FEVER.

India	19	18	25	42	38	38	28	35	37	26	21	7	334
N.-W. F. P.	1	...	2	2	9	8	3	3	8	1	1	1	39
Punjab	...	...	4	11	12	6	8	9	6	12	7	...	75
U. P.	...	2	3	11	5	3	5	9	5	3	2	2	50
B. & O.	3	5	7	6	4	3	2	3	5	2	1	1	42
Bengal	2	...	2	3	1	1	2	1	1	4	2	1	20
C. P.	...	1	...	...	...	2	...	...	1	...	...	...	4
Bombay	6	...	2	2	4	5	2	3	1	1	4	...	30
Madras	5	6	2	1	...	6	1	2	1	...	...	1	25
Assam	...	1	...	...	...	...	...	...	...	1	2	1	5
Burma	2	2	3	4	...	2	3	3	5	2	...	...	26
Andamans	...	...	...	...	1	1	...	...	...	...	1	...	3

TABLE H.—ADMISSIONS FROM CHOLERA, SMALLPOX, ENTERIC FEVER, MALARIA, PYREXIA OF UNCERTAIN ORIGIN, TUBERCULOSIS OF THE LUNGS, PNEUMONIA, DYSENTERY AND DIARRHŒA BY MONTHS—*contd.*

	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.
MALARIA.													
India	1,300	979	1,370	1,458	1,585	1,666	2,148	2,554	3,025	4,471	3,683	2,400	26,639
N.-W. F. P.	48	58	76	58	114	113	124	130	148	552	248	117	1,786
Punjab	313	172	187	236	291	273	452	488	843	1,509	1,035	629	6,428
U. P.	167	129	268	300	285	269	363	455	622	742	425	226	4,251
B. & O.	55	56	55	81	60	49	54	109	81	63	67	49	779
Bengal	340	236	351	323	355	391	498	551	473	661	794	594	5,567
C. P.	18	19	6	11	1	7	14	31	15	19	34	10	185
Bombay	205	177	276	240	202	198	284	333	394	524	729	525	4,087
Madras	11	12	15	7	9	26	16	19	59	35	30	21	260
Assam	21	8	25	30	34	85	42	50	54	66	53	32	500
Burma	33	36	22	36	28	26	37	44	22	15	43	45	387
Andamans	77	59	67	108	166	200	211	241	164	122	105	101	1,621
PYREXIA OF UNCERTAIN ORIGIN.													
India	88	90	104	146	120	86	115	120	170	128	99	77	1,343
N.-W. F. P.	3	3	2	5	4	2	1	2	...	...	...	1	23
Punjab	10	7	7	18	28	15	46	35	113	47	28	35	389
U. P.	34	40	24	43	27	26	37	30	18	29	18	15	341
B. & O.	1	...	...	15	8	1	...	1	1	2	...	2	31
Bengal	24	29	48	46	28	22	12	25	15	27	30	7	313
C. P.	1	3	8	6	2	3	3	1	8	7	2	6	50
Bombay	...	2	3	2	2	1	...	...	2	2	1	1	16
Madras	...	...	1	...	1	...	...	1	...	1	1	...	5
Assam	...	...	...	...	...	...	3	...	1	...	1	...	5
Burma	15	6	10	10	20	12	13	23	12	13	17	10	161
Andamans	...	...	...	...	...	...	...	...	...	...	...	...	...
TUBERCULOSIS OF THE LUNGS.													
India	72	76	59	68	77	65	70	132	73	55	53	51	851
N.-W. F. P.	3	7	4	16	7	7	2	7	1	...	1	1	56
Punjab	19	17	11	7	13	11	11	81	8	12	1	12	203
U. P.	17	10	9	10	14	6	10	16	10	8	12	7	129
B. & O.	6	8	4	6	6	7	10	6	7	2	2	3	67
Bengal	6	7	10	11	8	8	3	4	10	7	5	7	86
C. P.	3	1	...	2	3	3	10	3	3	1	3	1	33
Bombay	4	3	...	5	3	6	4	1	3	5	5	2	41
Madras	6	6	7	4	8	3	3	3	9	6	5	4	64
Assam	1	4	4	3	3	5	4	3	5	3	1	5	41
Burma	5	9	7	1	9	7	10	6	13	6	7	5	85
Andamans	2	3	2	2	1	1	3	2	4	5	7	4	36

TABLE H.—ADMISSIONS FROM CHOLERA, SMALLPOX, ENTERIC FEVER, MALARIA, PYREXIA OF UNCERTAIN ORIGIN, TUBERCULOSIS OF THE LUNGS, PNEUMONIA, DYSENTERY AND DIARRHŒA BY MONTHS—*concld.*

	Jan.	Feb.	Mar.	April	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.
PNEUMONIA.													
India	212	122	130	115	105	80	103	92	89	124	177	192	1,541
N.-W. F. P.	42	23	19	12	7	11	2	7	2	3	4	15	147
Punjab	29	10	10	13	5	8	15	8	15	26	41	28	208
U. P.	36	22	20	23	20	12	20	15	15	30	40	32	285
B. & O.	14	12	10	20	18	12	15	20	15	16	18	21	191
Bengal	22	15	19	10	23	12	22	10	10	14	16	30	203
C. P.	6	3	...	1	3	...	3	1	3	4	6	3	33
Bombay	33	12	27	17	7	3	6	11	7	10	15	36	184
Madras	5	4	6	3	3	4	3	1	4	3	6	2	44
Assam	8	4	4	4	4	5	4	7	5	5	3	2	55
Burma	6	10	8	8	10	11	10	8	9	11	20	18	129
Andamans	7	3	4	2	5	2	2	4	2	2	4	...	37
DYSENTERY.													
India	287	289	369	325	381	420	522	568	555	582	548	437	5,283
N.-W. F. P.	2	5	2	11	15	9	8	13	14	22	6	13	120
Punjab	15	27	55	25	55	49	64	152	141	64	108	64	819
U. P.	20	21	38	63	51	41	33	51	39	45	38	46	486
B. & O.	62	98	67	35	28	33	68	54	44	60	31	25	605
Bengal	50	36	101	91	95	66	99	87	76	137	141	97	1,076
C. P.	5	2	2	8	8	4	13	14	13	10	13	13	105
Bombay	54	32	43	26	27	47	75	67	62	54	48	56	591
Madras	39	26	18	17	30	37	35	34	54	60	43	67	460
Assam	8	15	21	29	45	67	48	44	66	79	60	27	509
Burma	21	18	14	12	20	50	47	32	22	34	28	12	310
Andamans	10	7	7	3	4	15	21	18	20	15	27	15	162
DIARRHŒA.													
India	162	187	294	218	259	268	305	321	233	259	252	180	2,938
N.-W. F. P.	1	4	7	5	11	12	10	8	3	4	2	1	68
Punjab	14	10	19	19	25	23	45	43	41	51	43	28	358
U. P.	13	21	61	42	49	54	49	34	24	27	29	28	431
B. & O.	50	84	95	37	45	30	46	28	23	47	26	10	521
Bengal	53	33	65	67	81	78	75	133	95	81	104	68	933
C. P.	4	...	7	2	5	5	9	6	7	3	7	...	55
Bombay	18	27	27	22	22	40	44	53	28	25	28	27	361
Madras	3	1	1	4	1	2	2	2	1	3	2	2	24
Assam	3	5	9	11	5	13	11	7	6	7	4	2	83
Burma	2	1	...	5	3	2	7	2	4	3	2	4	35
Andamans	2	1	3	4	6	6	2	1	...	4	4	7	40

Table I.—Details of Diseases.

Jail population of India 152,060

	Admissions.	Deaths.
Diseases caused by Infection.		
Blackwater fever	2	2
Chicken-pox	633	1
Cholera	5	..
Dengue	155	1
Dysentery	5,283	124
Encephalitis	1	..
Enteric fevers	334	38
Enteritis infective (including food poisoning)	10	4
Erysipelas	50	5
Gangrene, acute infective	10	5
Hydrophobia (Rabies)	6	1
Influenza	4,629	18
Jaundice spirochaetal	36†	8†
Kala-azar	275	8
Oriental sore	26	..
Leprosy	170	4
Malaria	26,639	101
Measles	81	..
*Meningococcal infection	106	54
Mumps	2,453	..
Plague	2	2
Pyrexia of uncertain origin	1,343	4
Rheumatic fever	421	2
Sandfly fever	669	..
Septicæmia	9	8
Smallpox	56	2
Tetanus	5	2
Tuberculosis Pulmonary	851	255
Tuberculosis Other cases	187	87
Undulent fever	7	3
Gonorrhœa	428	1
Soft chancre	101	..
Syphilis	699	4
Other venereal diseases	9	..
Other diseases caused by infection	263	4
Diseases due to infestation by metazoan parasites.		
Ankylostomiasis	1,921	27
Ascariasis	21	..
Bilharziasis	1	..
Dracontiasis (Guinea-worm)	136	..
Other intestinal parasites	1	..
Scabies	774	..
Other diseases due to infestation	219	..

* Cerebrospinal fever.

† Weil's disease.

TABLE I.—DETAILS OF DISEASES—*contd.*

	Admissions.	Deaths.
Diseases of the nervous system.		
Aphasia	..	1
Cerebral hæmorrhage	12	5
Chorea	1	..
Epilepsy	130	10
Meningitis	2	2
Neuralgia	131	..
Neuritis	21	1
Paralysis	25	1
Sciatica	40	..
Other diseases of the nervous system	243	41
Mental Diseases.		
Hysteria	17	..
Involution (Melancholia)	27	1
Mania	33	1
Mental deficiency	16	..
Neurasthenia	5	..
Schizophrenia (Dementia præcox)	28	1
Other mental diseases	5	..
Diseases of the Eye.		
Blepharitis	3	..
Conjunctivitis	694	..
,, granular (trachoma)	64	..
Cataract	15	..
Glaucoma	5	..
Iritis	14	..
Keratitis	9	..
Other diseases of the eye	402	..
Diseases of the Ear.		
Inflammation of the external ear	141	..
Diseases of the middle ear	66	..
Diseases of the mastoid process	12	..
Other diseases of the ear	39	..
Diseases of the Nose.		
Diseases of the mucuous membrane	252	..
Diseases of the bone and cartilage	70	..
Other diseases of the nose	173	..
Diseases of the Circulatory System.		
Diseases of the valves	3	1
Disordered action of the heart	4	4
Diseases of blood vessels	149	52
Endocarditis	35	12
Myocarditis	9	1
Pericarditis	4	..
Other diseases of the circulatory system	110	32

TABLE I.—DETAILS OF DISEASES—*contd.*

	Admissions.	Deaths.
Diseases of the Blood and blood forming organs.		
Anæmia	581	52
Diseases of the spleen	100	2
Lymphadenitis	281	..
Lymphangitis	42	..
Other blood diseases	771	15
Diseases of Glands of Internal Secretion.		
Hyperthyroidism	2	..
Other diseases	17	2
Diseases of the Breast.		
Mastitis	2	...
Other diseases	9	...
Diseases of the Respiratory System.		
Asthma	843	23
Bronchitis	3,247	15
Empyema	3	1
Laryngitis	3	..
Pleurisy	249	13
Pneumonia	1,541	336
Other diseases	162	5
Diseases of the Teeth and Gums.		
Caries of the enamel dentine and cementum	84	..
Gingivitis	52	..
Pyorrhœa alveolaris	44	2
Other diseases	310	..
Diseases of the Digestive System.		
Appendicitis	68	5
Cholecystitis and cholangitis	10	1
Colic	688	2
Colitis	3,574	25
Constipation	313	...
Diarrhœa	2,938	35
Enteritis	288	17
Fistula in ano	45	..
Gastritis	120	4
Glossitis	4	..
Hæmorrhoids (Piles)	565	2
Hepatitis acute	36	1
Hepatic abscess (Tropical abscess)	13	3
Hepatitis chronic (Cirrhosis)	33	15
Hernia	87	2
Indigestion	905	1
Intestinal obstruction	15	10
Inflammation of the palate and pillars of the fauces	10	...
Jaundice	466	3
Pharyngitis	168	..
Peritonitis	4	2
Sprue	25	4
Stomatitis	109	..
Tonsillitis	223	1
Other diseases	730	25

Table I.—Details of Diseases—*contd.*

	Admissions.	Deaths.
Diseases due to Disorders of Nutrition or of Metabolism.		
Beriberi	16	..
Diabetes mellitus	20	2
Gout	5	..
Inanition	6	..
Scurvy	31	..
Other diseases	10	2
Diseases of the Male Organs of Generation.		
Epididymitis	11	..
Orchitis	234	2
Paraphimosis	5	..
Phimosis	65	2
Prostatitis	11	1
Stricture of the urethra	24	..
Urethral fistula	6	..
Urethritis	10	..
Other diseases of the male organs of generation	245	1
Diseases of the Female Organs of Generation.		
Abortion	12	..
Dysmenorrhœa	1	..
Endometritis	24	..
Menorrhægia	2	..
Other diseases peculiar to women	68	1
Diseases of bones, joints, muscles, fasciae and bursae.		
Arthritis	93	..
Diseases of the spine	19	..
Myalgia	364	..
Osteo-myelitis	1	..
Periostitis	8	..
Synovitis	221	4
Other diseases	200	2
Diseases of the Areolar Tissue.		
Boil	1,003	..
Carbuncle	29	1
Cellulitis	830	13
Cellulitis Suppurative (Abscess)	2,504	4
Other diseases of the areolar tissue	84	1
Diseases of the Skin.		
Dermatitis	38	..
Eczema	385	..
Herpes Zoster	55	..
Impetigo	19	..
Psoriasis	2	..
Urticaria	71	..
Whitlow	190	..
Other diseases of the skin	1,939	4

TABLE I.—DETAILS OF DISEASES—*concld.*

	Admissions.	Deaths.
Diseases of the Urinary organs.		
Calculus of bladder	1	..
,, kidney	5	..
Cystitis	14	1
Hæmaturia	11	..
Incontinence of urine	4	..
Nephritis acute	103	13
,, chronic	60	19
Other diseases	166	9
General Injuries.		
Burns and scalds	79	..
Heat-stroke	8	..
Heat-exhaustion	99	12
Sun-stroke	13	6
Other injuries	69	10
Local Injuries.		
Abrasions	87	..
Burns and scalds	177	..
Concussions	3	1
Contusions	424	..
Dislocations and displacements	11	..
Fractures	241	9
Sprains and strains	101	1
Wounds, gun shot	3	..
,, others	1,876	26
Injuries self-inflicted	..	5
Other injuries	553	16
Tumours and Cysts.		
Cysts	20	..
Sarcoma	1	..
New growths, malignant (other cases)	27	2
,, ,, non-malignant.	8	..
Malformations	1	..
Poisons.		
Chemical poisons	1	..
Opium	34	3
Venom of insecta	6	..
,, Ophidia (Snake bite)	13	..
Other poisons	45	3
No appreciable disease	104	..
All other causes	74	2
Total	85,119	1,743

GIPD—456 DGIMS—7-9-35—1,000.

NPH—AR 2/33.

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FOR 1933

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ANNUAL REPORT OF THE PUBLIC HEALTH COMMISSIONER WITH THE GOVERNMENT OF INDIA FOR 1933.

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ABBREVIATIONS.

A.	Admissions.
Av. C. S.	Average constantly sick.
B. O. Rs.	British Other Ranks.
D.	Deaths.
I. O. Rs.	Indian Other Ranks.
N. C. Os.	Non-Commissioned officers.
P.	Primary.
P. A.	Per annum.
P. M.	Per mille.
P. U. O.	Pyrexia of uncertain origin.
R.	Revaccinations.
V. D. H.	Valvular diseases of the heart.

ANNUAL REPORT OF THE PUBLIC HEALTH COMMISSIONER WITH THE GOVERNMENT OF INDIA FOR 1933.

VOLUME II.

SECTION I.

ON THE HEALTH OF THE BRITISH ARMY IN INDIA.

(From the Director of Medical Services in India.)

1. General health statistics of the British Army in India during the year 1933 are given in the table below:—

TABLE 1.

1933.	Average strength.	Admissions.		Deaths.		Invalids sent home.		Invalids discharged in India.		Invalids finally discharged in U. K.		Average constantly sick.	
		No.	Ratio per 1,000.	No.	Ratio per 1,000.	No.	Ratio per 1,000.	No.	Ratio per 1,000.	No.	Ratio per 1,000.	No.	Ratio per 1,000.
Officers . .	2,355	1,031	437·8	15	6·37	42	17·83	..	..	..	..	33·91	14·40
B. O. Rs.' .	54,996	33,528	609·6	134	2·44	503	9·15	3	..	..	..	1476·69	26·85
B. O. Rs.' Wives.	4,368	1,368	313·2	12	2·75	50	11·45	..	..	..	..	46·37	10·62
B. O. Rs.' Wives' parturition.	..	834	..	2	..	..	..	..	..	..	..	33·39	..
B. O. Rs.' Children.	6,694	1,887	281·9	74	11·05	10	1·42	..	..	..	..	57·81	8·64
Others . . .	..	2,432	..	47	..	51	..	..	..	..	..	66·02	..

The rations per 1,000 for admissions, deaths and invalids, amongst officers and other ranks for the quinquennial periods 1910—14, 1920—24, and 1925—29, with that for 1930, 1931, 1932 and 1933 are given separately for purposes of comparison in the following table:—

TABLE 2.

Periods.	Ratio per 1,000.					
	Admissions.		Deaths.		Invalids.	
	Officers.	Other Ranks.	Officers.	Other Ranks.	Officers.	Other Ranks.
1910—14 . .	567·5	567·2	5·14	4·36	16·34	7·03
1920—24 . .	676·7	791·9	6·71	5·24	20·09	18·91
1925—29 . .	589·9	619·4	5·25	2·90	17·44	13·50
1930 . . .	392·3	611·3	5·95	2·78	21·69	8·70
1931 . . .	420·4	647·0	7·76	2·78	17·68	9·76
1932 . . .	463·2	581·5	6·54	2·96	27·45	7·39
1933 . . .	437·8	609·6	6·37	2·44	17·83	9·15

B. O. Rs.—British Other Ranks.

Officers.

2. 437·8 per 1,000 of strength were admitted to hospital during the year, compared with 463·2 in 1932.

The principal causes of sickness were:—

Malaria	107	Fractures	28
Inflammation of areolar tissue	77	Sprain and strain	22
Sandfly fever	65	Concussions	22
Jaundice	61	Appendicitis	21
Diarrhœa	52	Dengue	21
Dysentery	51	Pharyngitis	16
Influenza	46	Gastritis	15
Tonsillitis	38	Boils	12
Contusion	34	Abrasions	11

There were 15 deaths giving a ratio of 6·37 per 1,000 compared with 15 and 6·54 per 1,000 in 1932.

The causes of death were—

Pneumonia (5 cases), Injuries (2 cases), Appendicitis (1 case), Typhus fever, Tropical abscess, Influenza, Poliomyelitis acute, Hemiplegia, V. D. H., and Embolism (1 case each).

The average constantly sick in hospital was 33·91 or 14·40 per 1,000 of strength as compared with 16·88 in the previous year.

1,301 or 552·4 per 1,000 of the strength were treated as outpatients.

Soldiers.

3. 33,528 or 609·6 per 1,000 of the strength were admitted to hospital, compared with 581·5 in 1932 and 580·5 in 1913.

The principal causes of admission to hospital showing the increase or decrease compared with the previous year were—

	1933.	Increase or decrease.		1933.	Increase or decrease.
Malaria	5,681	+1,027	Dengue	644	+212
Inflammation of the areolar tissue	2,478	+ 144	Synovitis	490	+ 13
Sandfly fever	2,252	— 10	Boils	403	— 32
Inflammation of tonsils	1,777	— 87	Jaundice	392	— 84
Dysentery	1,369	— 16	Appendicitis	389	— 47
Gonorrhœa	1,276	— 178	Inflammation of Nasopharynx	377	— 46
Influenza	1,144	+ 106	Constipation	323	— 37
Sprain	1,009	+ 93	Soft Chancre	275	— 28
Diarrhœa	842	+ 110	Syphilis	267	— 63
Contusion	710	— 19			
Fractures	694	— 36			
Inflammation of bronchi	744	— 165			

There were 1,351 more admissions in 1933 than in the previous year. The biggest rise (1,027) occurred in the malaria admissions; dengue, inflammation of areolar tissue, diarrhœa, influenza and sprain also caused increased admission. Bronchitis and Gonorrhœa show a decrease, and there are other minor variations mainly giving a lower figure than 1932.

There were 134 deaths or 2·44 per 1,000 of the strength compared with 2·96 per 1,000 in 1932.

The most important causes of mortality were—

Local injuries	29
Pneumonia	15
Enteric group of fevers	14
Heat-stroke	9
Other general injuries	11

503 or 9·15 per 1,000 of the strength were sent home as invalids, compared with 409 or 7·39 per 1,000 in 1932.

The principal causes of invaliding to the United Kingdom were:—

	1933.	Increase or Decrease.		1933.	Increase or Decrease.
Mental diseases, other than Dementia praecox	55	+18	Fractures	21	+ 7
Pulmonary tuberculosis	48	+44	Deformities of limbs	20	+ 6
Epilepsy	40	+17	Injuries, other than fractures	19	..
Diseases of joints	31	+ 8	Valvular diseases of the heart	16	— 4
Inflammation of the middle ear	24	+ 9	Diseases of bronchi and bronchioles	13	— 1
Dementia praecox	23	+11	Neurasthenia	14	— 3
			Tuberculosis, other than pulmonary	12	— 3
			Diseases of urinary system	12	+ 2

The increase in mental diseases and epilepsy is striking.

The average number constantly sick in hospital was 1476·69 or 26·85 per 1,000 of the strength, compared with 1458·31 or 26·35 per 1,000 in 1932.

The diseases chiefly responsible were—

Malaria	165·19	Tonsillitis	43·26
Gonorrhœa	162·45	Sprain and strain	33·14
Inflammation of areolar tissue	91·29	Influenza	30·29
Dysentery	69·08	Soft chancre	28·97
Fractures	53·73	Bronchitis	25·91
Sandfly fever	45·47	Syphilis	21·65

90,067 men, or 1637·7 per 1,000 of the strength, were treated as out-patients, with an average daily number under treatment of 1257·06 or 22·86 per 1,000.

The combined ratio constantly sick in hospital and under treatment as out-patients was 49·71 per 1,000 of the strength, compared with 48·02 in 1932.

The actual loss to the Army in India in working days was 538,992 due to sick in hospital and 458,827 due to sick in barracks, making a total of 997,819 days compared with 972,579 in 1932.

The admission and death ratios per 1,000 of the strength for all causes and certain important diseases for stations with a strength of 1,000 and upwards compared with all-India, are shown in the following tables:—

TABLE 3.

Table showing admission and death ratios per 1,000 of the strength for all causes and certain important diseases for stations with a strength of 1,000 and upwards compared with all-India.

Stations with total admission ratios higher than all India.

		Peshawar.	Nowshera.	Sialkot.	Quetta.	Lahore.	Rawalpindi.	Jubbulpore.	Jhansi.	All-India.
Strength.		1,674	1,609	1,303	2,577	1,061	2,309	1,344	1,241	4,996
All Causes.	A.	1065·7	955·4	762·1	698·5	673·9	635·8	628·0	622·9	609·6
	D.	3·88	1·24	1·53	1·55	3·77	3·46	2·98	4·83	2·44
	Av. c. s.	37·97	29·67	29·84	27·64	39·65	28·22	30·43	23·80	26·85
Malaria	A.	389·5	306·4	264·0	226·6	80·1	88·8	73·7	49·2	103·3
	D.	...	0·62	...	...	...	...	0·74	...	0·05
Sandfly fever	A.	243·7	161·6	6·1	...	60·3	68·0	3·7	32·2	40·9
	D.	...	...	...	...	...	...	...	...	...
Enteric group of fevers.	A.	3·0	3·7	3·1	1·6	4·7	2·2	...	3·2	3·2
	D.	...	...	0·77	...	...	0·43	...	0·81	0·25
Dysentery	A.	41·2	13·1	27·6	55·1	12·3	23·8	22·3	45·1	24·9
	D.	...	...	...	...	...	...	...	...	0·02
Diarrhœa	A.	29·9	11·8	26·9	14·4	30·2	25·6	11·2	38·7	15·3
	D.	...	...	...	...	...	...	...	...	...
Influenza	A.	10·8	38·6	31·5	50·8	0·9	15·2	...	38·7	20·8
	D.	...	...	...	...	...	...	...	1·61	0·05
Pneumonia (lobar and lobular).	A.	3·0	2·5	3·1	2·7	1·9	6·5	5·2	8·9	3·6
	D.	...	1·24	...	0·78	...	...	0·74	...	0·27
Venereal diseases.	A.	26·9	9·9	28·4	24·4	47·1	42·9	28·3	28·2	33·4
	D.	...	...	...	...	...	...	...	...	...
Minor septic diseases	A.	47·8	62·2	70·6	47·3	50·9	64·5	112·4	73·3	58·1
	D.	...	...	...	...	...	...	...	...	...
Local injuries	A.	48·4	53·4	70·6	64·8	67·9	62·4	93·7	58·8	60·2
	D.	0·60	...	...	...	0·94	0·87	...	0·81	0·53
Heat-stroke	A.	0·6	2·5	...	...	0·9	0·4	...	1·6	0·4
	D.	...	...	...	...	...	0.87	...	1·61	0·16
Heat exhaustion.	A.	5·4	13·1	...	...	5·7	0.4	1·5	...	1.6
	D.	..	..	...	...	...	..	...	...	0.04

Stations with total admissions lower than all India.

		Mhow.	Meerut.	Karachi.	Poona.	Calcutta.	Razmak.	Secunderabad.	Bangalore.	Lucknow.	Ranikhet.	All-India.
Strength.		1,538	1,945	1,122	2,371	1,060	1,076	2,743	1,295	2,121	1,174	54,996
All Causes	A.	587·1	542.9	521.4	517.9	495.3	490.7	476.1	468.0	357.9	338.2	609.6
	D.	2·60	1·03	2.67	4.64	3.77	3.72	1.46	3.09	0.47	2.56	2.44
	Av. c. s.	25·63	28·22	28.58	37.57	26.67	20.38	25.84	28.45	17.75	27.84	26.85
Malaria	A.	98·2	34·4	139·0	84·4	52·8	87·4	10·9	6·9	10·4	11·1	103·3
	D.	...	...	...	...	...	...	...	...	...	...	0·05
Sandfly fever	A.	0·7	25·2	0·9	9·7	...	...	37·9	...	47·1	...	40·9
	D.	...	...	...	...	...	...	...	...	...	...	...
Enteric group of fevers.	A.	...	5·1	0·9	0·8	0·9	0·9	1·8	0·8	2·8	6·0	3·2
	D.	...	...	...	0.42	...	0·93	...	...	...	0·85	0·25
Dysentery	A.	23.4	41.6	14·3	28·7	23·6	19·5	48·1	27·8	19·8	11·1	24·9
	D.	...	...	...	...	...	...	...	...	...	...	0·02
Diarrhœa.	A.	19·5	6·7	8·0	4·2	5·7	3·7	13·1	9·3	5·7	11·9	15·3
	D.	...	...	...	...	...	...	...	...	...	...	...
Influenza	A.	25·4	4·6	21·4	7·2	24·5	...	1·5	...	17·9	16·2	20·8
	D.	...	...	...	...	...	...	0·36	...	...	...	0·05
Pneumonia (lobar and lobular).	A.	1·3	4·1	2·7	2·5	11·3	6·5	2·6	...	...	0.9	3·6
	D.	...	0·51	0·89	0·84	0·94	0·93	...	...	...	...	0·27
Venereal diseases.	A.	11·7	21·1	27·6	24·9	37·7	12·1	32·1	60·2	44·8	12·8	33·4
	D.	...	...	...	...	...	...	...	...	...	...	...
Minor septic diseases.	A.	46·2	45·8	33·9	43·4	35·8	65·1	52·5	58·7	30·6	26·4	58·1
	D.	...	...	...	...	...	...	...	...	...	...	...
Local injuries.	A.	83·9	76·6	43·7	50·6	46·2	35·3	50·7	61·8	40·5	46·0	60·2
	D.	0·65	0·51	0·89	0·42	...	...	0·36	...	0·47	...	0·53
Heat-stroke	A.	...	...	...	...	...	...	...	...	...	...	0·4
	D.	...	...	...	...	...	...	...	...	...	...	0·16
Heat exhaustion.	A.	...	0·5	...	...	...	0·9	...	...	...	...	1·6
	D.	...	...	...	...	...	...	...	...	...	...	0·04

A.—Admissions. D.—Deaths.
Av. c. s.—Average constantly sick.

Women and Children (B. O. R.'s).

4. 1,368 women or 313·2 per 1,000 of the strength were admitted to hospital, compared with 1,262 or 292·3 per 1,000 in 1932.

The principal causes of admission to hospital were:—

Malaria	152	Appendicitis	38
Abortion	130	Inflammation of bronchi	36
Inflammation of tonsils	69	Dysentery	36
Diarrhœa	42	Inflammation of areolar tissue	31
Constipation	41		

In addition, 834 women were admitted to hospital for parturition.

2,730 or 625·0 per 1,000 of the strength were treated as out-patients.

1,887 children or 281·9 per 1,000 of the strength were admitted to hospital compared with 1,999 or 299·1 in 1932.

The principal causes of admission to hospital were:—

Inflammation of the tonsils	194	Constipation	60
Malaria	170	Enteritis	52
Dysentery	149	Hypertrophy of the tonsils	46
Inflammation of bronchi	129	Pneumonia	45
Diarrhœa	124	Inanition	40
Inflammation of areolar tissue	76		

There were 74 deaths giving a ratio of 11·05 per 1,000. The chief causes were:—

Enteritis	10	Dysentery	4
Inanition	7	Premature birth	4
Convulsions	5	Diphtheria	4
Asphyxia of child	5	Pneumonia	3

4,611 or 688·8 per 1,000 of the strength were treated as out-patients.

TABLE No. 4.

	Number of admissions to hospital.	Deaths.	Invalids sent home.	Average constantly sick.
Royal Navy	41	..	..	2·81
Royal Air Force (Wives and Children)	91	1	..	2 50
Royal Air Force	1,251	16	14	22·20
Parturition (wives) Royal Air Force	1	..	..	0·04
Q. A. I. M. N. S.	96	1	12	5 32
Wives of officers (British and Indian Service)	311	3	23	8 93
Wives of officers (British and Indian Service) Parturition	130	..	..	4·75
Children of officers (British and Indian Service)	159	4	2	5 19
Royal Indian Marine	23	..	..	0·72
Patients not belonging to His Majesty's Regular Troops	308	22	..	12·87
Parturition cases of wives of personnel not belonging to His Majesty's Regular Troops	21	..	..	0·69

PRINCIPAL DISEASES AFFECTING THE BRITISH ARMY.

Cerebro-spinal meningitis.

5. Table No. 5 shows the number of cases which have occurred in the last 5 years.

TABLE No. 5.

	1929.		1930.		1931.		1932.		1933.	
	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.
B. O. Rs.	3	2	1	..	2	2	8	6	3	2
I. O. Rs.	8	3	15	12	15	9	9	9	24	16
Officers, Women and Children	1	1	..	..	..	..	..	..	1	1
Total	12	6	16	12	17	11	17	15	28	19

A—Admissions. D—Deaths.

Hitherto only sporadic cases have occurred among British troops at rare and irregular intervals. Among Indian troops cases have been more common, particularly in certain recruiting battalions. The disease as it occurs in India is of a severe and fulminating type, and death frequently ensues within 48 hours of the onset of symptoms. The mortality rate is extremely high, averaging 70% over five years. As serum is administered (intrathecally and if necessary intravenously and intramuscularly) in all cases there is little evidence that this form of treatment has any effect on the course of the disease.

The disease has of recent months shown a marked increase among the civil population and the situation presents several disquieting features.

Cysticercosis.

6. Interest in this condition, as it affects India, has been revived in consequence of recent and important work on the subject.*

Prophylactic measures advised were of general nature, because the exact mode of infection is not yet known—although carrier infection is suspected.

At present there is no evidence to show that human cysticercosis is the result of auto-infection.

Dengue, Sandfly fever, Fevers of the Typhus Group, and P. U. O.

7. The incidence of these diseases during the last 3 years is given in the table below:—

TABLE No. 6.

	1931.		1932.		1933.	
	Admns.	Ratio per 1,000.	Admns.	Ratio per 1,000.	Admns.	Ratio per 1,000.
Dengue	659	11·8	432	7·8	644	11·7
Sandfly fever	2,203	39·4	2,262	40·9	2,252	40·9
P. U. O.	202	3·6	106	1·9	61	1·1
Fevers of Typhus group.	8	0·1	11	0·2	23	0·4

* See transactions of the Royal Society Tropical Medicine and Hygiene, Vol. XXXVI, No. 6, page 525, 1933.

Dengue.

As heretofore, the majority of the cases of dengue have occurred in the personnel of garrisons in seaport towns. Owing to the proximity of the barracks to areas occupied by the civil population, the problem of eliminating the vector of the disease is a very difficult one.

Sandfly fever.

The figures for sandfly fever have remained at a very constant level for the last three years. The majority of cases continue to occur in Northern India, and particularly in certain stations on the North-West Frontier.

Sandfly fever has been the subject of special investigation during the year.

The entomological aspect of the problem has been studied in Landikotal, where the investigations were directed by a specially trained worker detailed by the Indian Research Fund Association.

As far as they went, the results obtained were satisfactory. The exact local conditions required for sandfly breeding were defined, and once this had been done no difficulty was experienced in locating innumerable breeding places. So widespread are these conditions that the problem of control appears, under Indian conditions, to be practically insoluble. In compact and well administered areas such as Landikotal itself, something *might* be accomplished: in straggling cantonments such as Peshawar the problem is a hopeless one. Work is nevertheless being carried out to determine the best method of treating breeding areas so that this knowledge may be available should special circumstances arise calling for its application.

Eight species of sandflies were identified. Approximeatly 90% of the sandflies captured were Phlebotomus papatasi.

It was mentioned in last year's report that it seemed possible that infection was being acquired (as far as Landikotal is concerned) through men being bitten while on duty at night in the perimeter defences. Control observations were made during 1933 on a group of men who at no time were on night duty on the perimeter. The incidence in these men showed no appreciable difference from that in the remainder of the garrison, from which it would appear that infection is being acquired in the barrack rooms as well as elsewhere. The complaint made by the men that they are bitten more severely while on the perimeter is probably due to the fact that, being awake, they notice the bites to a greater extent.

The investigation of the etiology of the disease, which has been going on at Peshawar, has produced interesting results. In 1932 certain observations were made which suggested that the casual organism in at least a proportion of cases (for it was thought that clinical variations in type could be detected) was leptospira?

By carrying out a large series of blood cultures (some 500) under ideal and carefully controlled conditions, this theory has been definitely disproved, and it can confidently be stated that sandfly fever of the Indian Frontier is not leptospiral in origin.

On the other hand, experiments which are not yet in a final state* leave little doubt that a filter passing virus is responsible, and attempts are being made to obtain this virus in a fixed form, in the hope that this may prove a stepping stone to the production of some form of immunising agent.

*Indian Journal of Medical Research, Vol. XXI, No. 4, pages 775—788.

Fever of the Typhus group.

An increase in the number of cases of this condition which have been diagnosed is probably to be attributed to a more widespread knowledge of the subject.

Including all ranks, British and Indian, and their families, a total of 44 cases, with 1 death, were reported.

While the disease is more common in certain localities than in others it is nevertheless widespread throughout the country.

When tick typhus was first described, diagnosis rested chiefly on the clinical features of the disease, which, especially in cases where the rash was well developed, were sufficiently characteristic to enable the condition to be recognised with certainty.

Agglutination tests have now been carried out with the serum of a considerable number of cases, using "0" suspensions of B. proteus X 2, X 19, and X Kingsbury. In practically all cases a rise of titre, often of considerable degree, has occurred as regards one or more of these strains, but the variation from case to case is such that it appears fairly certain that none of these three is the specific strain of proteus involved. Hitherto attempts to isolate proteus from these typhus fever cases have been unsuccessful, but concerted efforts are being made in this direction. It is believed that the isolation of a local strain will go a long way towards clearing up this problem.

The widespread use of "0" suspensions of the proteus strains for agglutination purposes has brought to light an interesting fact. In certain stations where the disease is prevalent a number of cases have occurred which were typical in most respects but which did not show the characteristic rash: they did, however, show a suggestive rise of titre towards the "O" suspensions of proteus. A careful scrutiny of these cases confirmed the opinion that these were probably "rashless" cases of typhus group fever. Occurring under other circumstances they would without doubt have been labelled "enteric group fever", or "P. U. O." Since this point was appreciated a few similar cases have been encountered in different parts of the country, and it seems probable that when our knowledge of the subject becomes more definite, and especially when and if a local strain of proteus is isolated, a further series of cases will detach themselves from "enteric group" and "P. U. O." and range themselves with fevers of the typhus group.

No definite progress has been made as regards the detection of the vector of this disease in India, but opinion is gaining weight that the tick is by no means the only arthropod involved.

Pyrexia of Uncertain Origin.

There is a continued satisfactory decrease in the number of cases diagnosed Pyrexia of Uncertain Origin.

Diphtheria.

8. The following table shows the occurrence of diphtheria among British troops for the last 3 years.

TABLE No. 7.

	1931.		1932.		1933.	
	Actuals.	Ratio per 1,000.	Actuals.	Ratio per 1,000.	Actuals.	Ratio per 1,000.
Admissions . .	71	1·3	73	1·3	69	1·3
Deaths . . .	1	0·2	..	..	2	0·02

Diphtheria is a disease in which the information given by the laboratory can on occasion be very confusing. In the straightforward case with clinical signs no difficulty exists. Treatment is inaugurated at once on the strength of the clinical data, and the laboratory affords confirmation of the correctness of the procedure. In cases which clinically are suggestive, but doubtful, the result of the examination of a swab is invaluable. But in those cases of sorethroat where no suggestion of diphtheria exists, but where a precautionary swab is taken, the outcome is often dire confusion. Experience has shown that innocuous diphtheroids which are morphologically indistinguishable from Corynebacterum diphtheriae are of relatively common occurrence. Where such are found present in the swab, few clinicians will accept the responsibility of treating the case other than as one of diphtheria until negative information is afforded by biochemical or biological tests. This involves swabbing and segregation of contacts, and frequently leads to numbers of men being unnecessarily off duty.

To minimise this as much as possible, special investigations have been made into the technique of isolating and testing the virulence of the organism, and a method has been devised which reduces considerably the interval of time necessary to give a definite result.*

Dysentery, Diarrhœa, Colitis and Amoebic Hepatitis.

9. The incidence for the last three years is shown in Table No. 8.

TABLE No. 8.

	Dysentery.		Diarrhoea.		Colitis.		Total.		Amoebic Hepatitis and Liver abscess.	
	Actuals.	Ratio per 1,000.	Actuals.	Ratio per 1,000.	Actuals.	Ratio per 1,000.	Actuals.	Ratio per 1,000.	Actuals.	Ratio per 1,000.
1931. .	1,593	28.5	862	15.4	19	0.3	2,474	44.3	71	1.3
1932. . .	1,385	25.0	732	13.2	31	0.6	2,148	38.8	69	1.2
1933. . .	1,369	24.9	842	15.3	53	1.0	2,264	41.2	36	0.7

* R. A. M. C. Journal Vol. LXII, June 1934, pages 391—396.

The 1933 figures are slightly higher than those of 1932, but the variation is trifling. Nevertheless there has been in the last ten years an upward trend in the admission ratio for these diseases. This has been attributed to the greater interest taken in the subject, and to the fact that the necessity for reporting sick in all cases of the kind is constantly being impressed on all ranks. The figures in Table No. 9 give a certain amount of confirmation to this hypothesis and show that the increase in "days lost" is being compensated by the decrease in invalids and deaths. The position is, however, far from satisfactory.

TABLE No. 9.

Dysentery, Diarrhœa and Colitis.	1924	1925	1926	1927	1928	1929	1930	1931	1932	1933
Adm. ratio per 1,000	26·4	27·9	31·7	33·0	32·7	36·9	40·9	44·3	38·8	**41·2**
Av. c. s. ratio per 1,000	1·31	1·32	1·43	1·51	1·46	1·66	1·88	1·84	1·65	**1·66**
Av. sick time in days.	18·21	17·21	16·39	16·70	16·30	16·42	16·80	15·19	15·54	**14·66**
Av. No. of days lost per 1,000 p. a.	481	480	520	552	533	606	687	672	602	**605**
Invalids (Actuals)	17	14	14	16	14	10	5	14	8	**8**
Deaths (Actuals)	8		2	2	2	1	1	1	..	**1**

A study of the different types of infection in bacillary dysentery throws an interesting light on the epidemiology of the disease. Some fifteen to twenty types of dysentery bacilli, of which ten are of comparatively common occurrence, can now be differentiated. Occasionally there may be a group or series of cases which is caused by the same type of organism, and is therefore referable to a common source. More frequently, however, this is not the case, and if an analysis be made of the types of bacilli in all cases occurring in a regiment in one season, it will be found that great diversity exists, and that few if any of the cases are etiologically related to each other. In other words, infection is not due to case to case spread within the unit, so much as to a constant bombardment from the massive and varied reservoir which exists among the civil population.

Within the confines of his own lines the soldier can be, and in most instances and to a large measure, is protected against infection. But it is neither practicable nor desirable that he should be constantly confined to barracks, and as soon as he moves afield the chance of safeguarding him from infection becomes remote, despite such measures as are taken regarding restaurants and other similar establishments. The diversity of organisms which are isolated is clear evidence of the fact that he derives his infection from such wide spread sources.

In the absence of protective inoculation, it would seem that the reduction of diseases of this group can only be effected by raising the standard of sanitation among the civil population. In cantonments much can be, and is being, done; but where there exist adjoining municipalities, or worse still rural villages in which sanitary control is practically non-existent, the problem is one which bristles with difficulties. Any improvement which may ensue will be of very slow development.

The proportions of the various types of dysentery, *vide* Table No. 10 show little variation from previous years.

TABLE No. 10.

	Actuals.	Ratio per 1,000.	
Protozoal (E. hist.)	169	12·34	
Bacillary dysentery (Bacteriologically proven.)	515	37·62	64·07
Bacillary exudate (No dysentery bacilli isolated)	362	26·44	
Clinical	323	23·59	

As noted in last year's report, a scheme of classification of mannite fermenting dysentery bacilli, based on recent work*, was introduced in June 1932. This has proved satisfactory in every way, and has done away with the bugbear of the "inagglutinable" Flexner. Table 11 shews the numbers of dysentery bacilli isolated by military laboratories in the last six years.

TABLE No. 11.

	Non-mannite fermenting.			Mannite fermenting.					
Year.	Shiga.	Schimtz.	Total.	Andrewes, Types.	Sonne.	New Types	Inagglutinable or unclassified.	Total.	Percentage inagglutinable or unclassified.
1928 . .	,,	29	,,	492	32	..	306	830	36·9
1929 . .	220	137	557	922	47	..	286	1,255	22·8
1930 . .	330	97	427	1,077	67	..	360	1,504	23·9
1931 . .	340	79	419	1,138	69	..	331	1,538	21·5
1932 . .	384	126	510	1,007	108	126	152	1,393	10·9
1933 . .	**253**	**80**	**333**	**960**	**198**	**315**	**91**	**1,564**	**5·8**

Of the 91 unclassified strains isolated in 1933, 46 were late lactose—saccharose fermentors (other than Sonne). Accumulating experience confirms the opinion that these are non-pathogenic. A proportion of the remaining 45 (3·9%) fall into serological types which have been identified but have not yet been included in the polyvalent serums issued for general use.

Among the "new types", three are of common occurrence. One—the commonest—is a dulcite fermentor, and is serologically identical with the "Newcastle"† bacillus, although differing from it biochemically. Another which has been examined by Dr. W. M. Scott, Ministry of Health, corresponds to the original B. dysenteriae Y (Lentz), which is not included in Andrewes' series. The third does not correspond as far as can be ascertained, with any hitherto described type, and is not included in the extensive series reviewed by Sartorius.‡

* Journal of the Royal Army Medical Corps, September 1931 and October—November 1932.

† Clayton and Warren 1929, Journal of Hygiene, Volume XXVII, page 355.

‡ Zentrablatt fur Bacteriologie, Parasitenkunde, und Infektionsbrankheiten October 1932, pages 10—49.

Of the remaining five types, one, which is relatively common in certain parts of India, occurs in Sartorius' series. The other four (all dulcite fermentors) do not appear to have been hitherto described. There is reason to believe that all these types are pathogenic and evidence on this point is being amassed.

The treatment of dysentery has followed the same lines as heretofore, and results have been satisfactory.

Dysentery in Quetta shows little sign of abating and, in fact, is at a higher level than in 1932. The type is mild, and the proportions of bacillary and amoebic infection are more or less normal. Investigations into the cause of this unusual incidence are proceeding.

One death from bacillary dysentery occurred at Allahabad. One B. O. R. was invalided for amoebic dysentery, four for bacillary dysentery, two for clinical dysentery, and one for colitis.

Tropical abscess of liver and hepatitis.

In all, 59 cases of liver abscess and hepatitis were admitted of which 36 were considered to be amoebic in origin. This is a considerable drop from previous years. 5 of the 36 cases were diagnosed amoebic abscess, but only 2 were treated surgically. There were no deaths nor invalids. One case relapsed twice.

Enteric Fevers.

10. The incidence of enteric fevers among British and Indian Troops during the years 1931, 1932 and 1933 is shown in Table No. 12.

TABLE No. 12.

British.

	1931.				1932.				1933.			
	Actuals.		Ratio per 1,000.		Actuals.		Ratio per 1,000.		Actuals.		Ratio per 1,000.	
	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.
Typhoid	58	7	1·0	0·13	64	12	1·2	0·22	56	11	1·0	0·20
Para. A	15	...	0·3	...	22	...	0·4	...	14	...	0·3	...
Para. B	3	..	0·05	...	2	...	0·04	...	1	...	0·02	...
Para. C	...	...	...	...	...	...	...	...	...	...	...	...
Enteric group	107	4	1·9	0·07	100	3	1·8	0·05	102	3	1·9	0·05
Total	183	11	3·3	0·20	188	15	3·4	0·27	173	14	3·1	0·25

Indian.

	1931.				1932.				1933.			
	Actuals.		Ratio per 1,000.		Actuals.		Ratio per 1,000.		Actuals.		Ratio per 1,000.	
	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D
Typhoid	118	18	0·95	0·15	97	9	0·8	0·07	81	15	0·7	0·13
Para. A	49	3	0·4	0·02	45	1	0·4	0·01	38	1	0·3	0·01
Para. B	7	...	0·06	...	8	...	0·1	...	2	...	0.02	...
Para. C	4	...	0·03	...	1	...	0·01	...	3	...	0·03	...
Enteric group.	133	7	1·07	0·06	105	7	0·9	0·06	120	7	1·0	0·06
Total	311	28	2·5	0·23	256	17	2·1	0·14	244	23	2·1	0·20

The variation in the number of cases occurring amongst British troops in these three years is trifling. In the year under review as compared with last year there is a decrease of 8 admissions for typhoid fever, 8 for paratyphoid A and 1 for paratyphoid B, and an increase of 2 for enteric group, thus giving an over all decrease of 14 cases.

These cases were sporadic in origin with the exception of an outbreak of 16 cases of typhoid fever in a detached company of infantry at Mazuffarpur and an outbreak of 9 cases of Paratyphoid A in Allahabad. The outbreak of typhoid fever was one of great severity, there being four deaths (*i.e.*, a case mortality of 25 %) and seven other cases whose condition gave rise to grave anxiety. The type of cases was in fact, in no way different in severity from that described in preinoculation days: and it is significant to note that all these men were "protected" *i.e.*, inoculated with 2 doses of T. A. B. vaccine within a period of 18 months. This gives further support to the observation made in a previous report, that inoculation although it definitely appears to lower susceptibility to infection, has little if any action in mitigating the severity of an attack when this is established. The source of infection was not traced, but there is reason to believe that milk which found its way into the lines from an unauthorised source was responsible. All the patients were in the habit of drinking milk as a beverage.

The outbreak of Paratyphoid A was mild. It was traced to a carrier—a coffee shop employee—who had been working in the same establishment for 3 years, and who therefore had presumably acquired his infection recently.

The position as regards diagnosis remains unchanged. Early blood culture is without question the most satisfactory method. Faeces and urine culture lend little assistance, and the agglutination test, while on occasion it may be of positive value, is of no negative significance. For use in this test concentrated suspensions of organisms are being issued with satisfactory results. Owing to the certainty with which batches of suspension can be prepared of a uniform standard, the "standard agglutinin unit" is being abandoned, and results will be expressed in terms of the denominator of the dilution in which standard agglutination occurs, an interpolation table being used where necessary.

T. O. suspensions continue to be used as a routine in these tests, and certain laboratories have experimented with A. O. and B. O. No striking results have been obtained, and the opinion is gaining weight that this test adds little to the results obtained by the older methods of diagnosis.

The inoculation state on 30th September is shown in Table 13, while Table 14 gives the incidence among protected and unprotected classes. The strengths in this table are the average of two half-yearly returns, and therefore are only approximate.

TABLE No. 13.

	Officers.	Other Ranks.
Strength	2,196	54,597
Number protected . .	2,066	54,389
Number unprotected . .	130	1,108
Percentage protected . .	94·08	97·97

TABLE No. 14.

Group.	Strength.	Actuals.		Ratio per 1,000.		Case mortality per cent
		Cases.	Deaths.	Cases.	Deaths.	
Protected . .	54,267	158	13	2·9	0·24	8·23
Unprotected .	1,015	15	1	14·8	0·99	6·66

In view of the conclusions reached at the R. A. M. College regarding the Rawlings strain of *Bact typhosum* which is used in the manufacture of T. A. B. vaccine, this question as far as it concerns India has been given close attention. T. A. B. vaccine for use in India is manufactured by the Central Research Institute, Kasauli. Here, as elsewhere, the Rawlings strain has been used, but from time to time this strain has been subjected to animal passage and as a result has maintained a "smooth" character. In addition to strain Rawlings, however, it has for some years been the practice to incorporate equal parts of a recently isolated and definitely smooth strain of *Bact typhosum* in the vaccine. It would therefore appear that the Central Research Institute vaccine has been manufactured throughout from "smooth" strains of *Bact typhosum*.

While this subject was under review, some very striking figures (Table 15) were compiled in regard to the incidence of "proved" typhoid fever in the first and in subsequent years of service in India. These figures commence from 1929, as this was the year in which the two dose system of inoculation was made compulsory in India.

TABLE No. 15.

	Under 1 year in India.						Over 1 year in India.					
		Cases.		Deaths.				Cases.		Deaths.		
	Strength.	Actuals.	Ratio per 1,000	Actuals.	Ratio per 1,000.	Case mortality.	Strength.	Actuals.	Ratio per 1,000.	Actuals.	Ratio per 1,000.	Case mortality.
1929. ..	9686	37	3·82	10	1·03	27·02	45,942	53	1·15	3	0·07	5.60
1930. ..	11258	30	2·66	7	0·62	23·33	44,169	30	0·68	3	0·07	10·01
1931. ..	11003	25	2·27	7	0·64	28	44,839	27	0·60	2	0·04	7.49
1932. ..	9043	25	2·76	7	0·77	28	46,203	28	0·61	4	0·09	14.27
1933. ..	12169	34	2·8	5	0·41	14·71	42,827	22	0·51	6	0·14	37·24
Av.1929—1933	10632	30·2	2·84	7·2	0·68	23·84	44,814	32	0·71	3·6	0·08	11·24

A scrutiny of this table shows that the proportionate admission ratio, case mortality and death ratio among men of over 1 year's service, and under 1 year's service are as follows.—

	Over 1 Year.	Under 1 Year.
Admission ratio.	1	4
Case mortality.	1	2·1
Death ratio.	1	8·6

There are various causes which may contribute to this state of affairs. Assuming exposure to infection to be more or less universal and inevitable, susceptible individuals who have little or no resistance even after inoculation are likley to be picked out early in their Indian service. Naturally developed immunity will be higher and longer the man serves in the country, and in the same way repeated inoculation may have a cumulative action. Also the older soldier becomes more experienced in looking after himself. It will be of great interest to observe the effect which the use of the R. A. M. College vaccine has on the incidence of typhoid fever during the first year of service.

The policy of examining menials for the carrier condition has been maintained. In all 11,560 menials were examined, a total of 39,657 stools being plated. This resulted in the detection of 3 carriers of *Bact. typhosum*, 2 of *Bact. paratyphosum A*, and 1 of *Bact. paratyphosum B*. At first sight this seems a poor return for the labour and time expended. On the other hand, the work has fulfilled its purpose as there have been no outbreaks traceable to the enlistment of a carrier.

Malaria.

Malaria-Ratio per 1,000—British Troops.

Table No. 16.

	Fresh.		Relapse.		Total.	
	1932.	1933.	1932.	1933.	1932.	1933.
Northern .	41·0	**120·2**	49·8	**39·6**	91·7	**159·8**
Eastern .	57·6	**43·8**	31·9	**18·8**	89·5	**62·6**
Southern .	40·4	**48·5**	22·0	**12·2**	62·4	**60·6**
Western .	87·5	**175·9**	43·6	**28·1**	131·1	**204·0**
Burma District	36·4	**24·9**	9·9	**14·9**	46·3	**39·8**
All-India .	49·2	**79·1**	34·9	**24·2**	84·1	**103·3**

In discussing malaria incidence in 1933, comparison will be made with incidence in 1932 and 1924. These two years have been chosen because, within recent times, the former was the best, and the latter was the worst, malaria year for British Troops in India. During this discussion, and in trying to discover why the 1933 incidence was heavier than that of 1932, and lighter than that of 1924, mention will be made of certain influential factors such as meteorology, war and the new synthetic drugs; but at the same time it has not been forgotten that factors which influence endemic prevalence are many and varied and—as in the case of influenza—some of them may even be unknown. It would be rash at the present juncture, prematurely to congratulate ourselves, since a comparatively low incidence of the disease may be but an indication of the fact that we are enjoying, temporarily, the calm and security found in the trough of a cyclical wave.*

The passage of years, or the occurrence of a big epidemic such as the visitation of 1908 (when it would be possible to compare military with civilian incidence) must supervene ere we can afford to indulge in dogmatism.

* "The Practice of Medicine in the Tropics" Byam and Archibald, Vol. II, P. 1549.

As compared with 1932, the all-India incidence of malaria rose by 19·2 per 1,000. Nevertheless, the 1933 figure of 103·3 has only been bettered in one other year prior to 1932, *viz.*, in 1928, when the corresponding figure was 91·3.

In India, the most important factor is the weather. On meteorological grounds alone it is easy to understand why 1933 was a worse malaria year than 1932; but these grounds do not serve to explain why it was so much better than 1924.

Roughly speaking, the malaria season begins soon after the monsoon sets in, and ceases after the monsoon ends. Over most of India the monsoon rainfall occurs in the period June—September, and October is the transition month when the monsoon retreats. It is therefore desirable to consider the period June—September, and the month of October, separately.

Meteorological conditions in 1933 were unusual. In the June—September period the rainfall was much above normal over the whole of India—the north-east and Burma excepted.

Marked local excesses in rainfall are quite common; but it is very uncommon to find such generalised and heavy excess as occurred in 1933.

This partly explains the increased incidence in Northern and Western Commands, and the decreased incidence in Eastern Command and Burma District; but it does not furnish the clue to the slight decrease in Southern Command, where an increase was to be expected.

The dominance of meteorological conditions over malarial incidence is well seen if malaria figures are studied in conjunction with the rainfall-temperature-humidity reports issued by the India Meteorological Department;* but as, to the general reader, the study of masses of figures is a wearisome business, the table which follows merely provides data enough to illustrate the general effect of weather conditions on the three selected years—1924, 1932 and 1933.

TABLE No. 17.

Meteorology-Mean of all India.

		The worst malaria year 1924.	The best malaria year 1932.	The year under discussion 1933.
Period June—September.	Rainfall. Percentage departure from normal	+8	—3	+14
	Temperature (F.). Departure from normal	+0·4	+0·5	—0·6
	Relative humidity at 8 A.M., (per cent.) Departure from normal	0	—2	+2
Whole year, Malaria incidence per mille		206·8	84·1	103·3

Referring to the 1933 rainfall, Dr. Normand says: "Such a general excess does not find a parallel in the last ten years"; but even 1924, bad as it was, was not nearly as bad as 1933.

Before examining this point further, it will be convenient first to dismiss the shorter and relatively less important period, *viz.*, the month of October, during which the monsoon retreats.

* Acknowledgment is again due to Dr. C. W. B. Normand, Director-General of Observatories, for his valuable help and advice.

October presents great variations from year to year; and when, in this month, excessive rainfall is general, a marked effect is produced on the incidence of malaria.

In the worst (1924) and best (1932) malaria years, the all-India rainfall departure from normal during October was plus 3: in 1933 the departure was plus 6.

Once again, for meteorological reasons, it is not to be wondered at that the comparatively low malaria incidence of 1932 was not fully maintained in 1933: and again and for the same reasons, it is surprising that the 1933 figures were so much better than those of 1924.

In one other respect 1933 was potentially a more dangerous year than 1932 or than 1924 because, in 1936, field service operations on a fairly big scale were, undertaken at the height of the malaria season, in the Mohmand-Bajaur country, Northern Command. In 1932 disturbances of this kind exercised a less baneful effect on the troops: in 1924 no such disturbances took place.

During the Mohmand-Bajaur operations, and mainly for reasons of health, the number of British troops employed in the field was kept as low as possible. These troops suffered very severely from malaria.

Outside the scene of active operations the expedition repercussed on the British troops in Peshawar and Rawalpindi Districts, because units and detachments had to be brought down from their hill stations earlier than usual (at the peak of the malaria season, in fact) for the purpose of "showing the flag" and performing various garrison duties in stations depleted of Indian Troops. The effect of this on incidence in the three districts mentioned above was evil to a degree. If there exists any army medical officer who is a militarist then surely a result such as this must force him to deplore the advent of war.

Operations of war did not affect incidence in the Western Command. However, there—and especially in Baluchistan, where the bulk of the troops are stationed—meteorological conditions were, in the malarial sense, of the worst possible description. From this, severe epidemic malaria resulted; and it is highly probable that the aftermath will produce an adverse effect on the 1934 figures—even if weather conditions in 1934 turn out to be favourable.

Despite increased rainfall and humidity, the Southern Command figures are encouraging, and would have been even better had not serious and prolonged floods occurred in several of the stations. Ahmednagar—where topographical difficulties are great—had a bad year; and the Poona garrison showed an unduly high incidence, especially amongst the troops forming the guard at the arsenal, Kirkee.

A gratifying decrease of incidence occurred in Eastern Command. A fierce outbreak of the disease in the Delhi Brigade Area was more than offset by striking declines in the Lucknow, Meerut, Presidency and Assam Districts. In Delhi, heavy and prolonged rains were followed by extensive floods, and the civil population was ravaged by the disease. In Meerut, Lucknow, and the north-eastern portion of the command monsoon conditions were relatively mild. The Lucknow statistics contained in Table 18 below, are interesting because it is believed that, in part at least, they reflect the results of progressive, planned anti-malaria field work, both sanitary and engineering.

TABLE No. 18.

Year.	Admissions per 1,000. British Troops.	Year.	Admissions per 1,000. British Troops.
1924	125·3	1929	108·4
1925	68·6	1930	104·6
1926	31·6	1931	53·5
1927	39·1	1932	14·1
1928	15·8	1933	**10·4**

The decline in the Burma District is mainly attributable to good weather conditions. In this district the per mille rate was:—In 1931, 62·5: in 1932, 41·0; and in 1933, 36·0.

Anti-malaria finance remained unchanged. The grant is still under the ban of the "cut".* Commands kept their estimates as low as possible. They asked for the very moderate sum of £5,114 on account of major engineering anti-malaria work. This demand was met by a grant of £1,242—obviously a wholly inadequate sum for all India.

The decision made in 1931, to abandon mosquito-proofing of barracks until the financial situation improves, still holds good. As a special measure a little work, to the extent of £151, was carried out at Agra Fort; but this is of course, of no consequence in view of the extent and gravity of the general situation. Still, it is of passing interest to observe that whereas, in the comparatively good year, 1932, Agra headed the incidence with a per mille rate of 310, in the bad year, 1933, this station dropped to fifth place, with a rate of 243 per 1,000.

In face of the figures contained in the sub-joined table, it is unnecessary to stress the importance of mosquito-proofing. It is devoutly to be hoped that this measure may be adopted once again, and soon.

A list of stations with strengths of over 700† in which malaria incidence exceeded 100 per mille.

TABLE No. 19.

Station.	Ratio.	Remarks.
Peshawar	389·5	Mosquito-proofing partial. Adversely affected by Mohmand-Bajaur operations.
Delhi	309·4	Fort alone is partially proofed. Floods occurred. Severe epidemic amongst civilians.
Nowshera	306·4	No mosquito-proofing. Adversely affected by Mohmand-Bajaur operations.
Sialkot	264·0	Ditto.
Agra	243·5	Fort alone is partially proofed.
Quetta	226·6	No mosquito-proofing. Heavy rains, floods, prolonged humidity.
Ambala	207·7	No mosquito-proofing.
Ferozepore	206·3	„ „ „
Ahmednagar	181·5	„ „ „
Karachi	139·0	„ „ „

*See pages 100 and 103 of last year's Report.
† Hill stations are not included.

Compare these places with a station which is almost completely mosquito-proofed: Mian Mir, now known as Lahore Cantonment. In this notorious station the average annual malaria incidence for the five years 1923-27 was 743. Proofing was carried out in 1927-30. The average annual incidence, 1928 to 1933, was 124·4.

It is submitted that nothing better than the above figures could serve to demonstrate what a great saving in health, in military efficiency and in money would accrue, were mosquito-proofing general in the barracks of British troops in India.

In the chequered history of malaria amongst British troops in India it has been noticed that stock-taking is not a prominent feature, albeit this annual Report furnishes the opportunity. The measure known as "cold storage" is a case in point. After much trouble and difficulty, this measure appeared to come to fruition in the year 1925.*

It held out promise of great things; but, since 1928,† little or nothing concerning its beneficial effect has been published.

In 1932, and again in 1933, certain questions connected with "cold storage" cropped up, certain investigations were made, and certain conclusions arrived at.

These conclusions may be summed up in the statement that this measure has not achieved anything like the results originally anticipated. This, of course, is not because of any weakness in the scheme itself, it is because it has been found impossible practically to carry out the scheme in its entirety; and no anti-malaria measure fails to attain its end so signally as "cold storage", when thoroughness is absent.

This measure, as originally devised, aimed at removing the bulk of the troops from the plains to the hills at the worst part of the malaria season. Against the successful working of the scheme stood (and still stand):—

(*a*) Exigencies of the military situation within, and on the frontiers of, India.
(*b*) Exigencies of military training, especially in horsed units.
(*c*) Shortage of accommodation in hill stations in Northern, and particularly in Eastern, Commands.‡

A few battalions are stationed in the hills all the year round. The men composing the remainder of the British force spend the following periods (approx.) of each year in the hills:—

Each infantryman	3 to 4 months.
Each cavalryman	1½ ,,
Each artilleryman	1 to 1½ ,,

Thus, half of the infantry stay in the hills in the comparatively innocuous months, mid-April to July, and are in the plains in the dangerous autumnal period.

A trooper may be in the hills from mid-April to end of May only—when the risk of fresh malarial infection in the plains is almost negligible.

So, too, may be the gunner; and his case is worst, for training in the artillery, in the plains, begins in the early autumn, when the risk of infection is at its greatest.

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* "Army Health in India". Mackenzie. 1929. P. 40.
† See the Report for 1928: P. 93.
‡ Unfortunately this also affects the women and children to a marked degree.

Then again, lack of barrack accommodation in the hills, or even personal predilection, account for the fact that some men spend their hill period on leave, or do not go to a hill station at all.

It is interesting to observe that in this matter the horse exercises a most evil influence. Thus, Horse and Field Artillery fare very badly; Medium Artillery is in better case; and the Royal Tank Corps comes off best of all.

From a medical point of view it is unfortunate that moves to and from the hills cannot be delayed until later in spring and autumn respectively; but the anti-malaria campaign must necessarily be subordinated to military and financial considerations, even in the case of British troops in India.

Despite certain disappointments and discouragements, field work (not including major engineering projects) maintained the high standard of recent years.

Thanks very largely to the teaching of Lieut.-Colonel J. A. Sinton, V.C., O.B.E., I.M.S., Director of the Malaria Survey of India, at the Ross Field Experimental Station, Karnal, much information has now been collected regarding the distribution of mosquitoes in more than sixty cantonments scattered over the whole country.

Obviously, information of this kind is of first-rate importance to anti-malaria officers in the intelligent conduct of their campaigns.

The following table is given in illustration of one of the activities of these officers. The details have been extracted from reports received from some of the more heavily infected cantonments during the three years 1931-33.

Distribution of the more important anopheline vectors, by months. (The figures under the mosquito columns indicate months of the year, in calendar order, when identifications were made).

TABLE No. 20.

Command.		Culicifacies	Maculatus	Stephensii	Minimus.	Listonii.
North	Peshawar	3 to 12	5	1 to 12	..	4 to 11
	Nowshera	1, 5, 7 to 11	1, 10	1, 5 to 11	7 to 9	..
	Sialkot	4, 5, 7 to 11	3, 7	3 to 11	..	..
	Ambala	1, 2, 3, 5, 6, 8, 11	3	2, 3, 8	..	..
	Ferozepore	4, 5, 7 to 12	..	4 to 10	..	..
	Landikotal	7 to 10	7	6 to 10	..	5
East	Delhi	8 to 11	..	5 to 11	..	..
	Agra	1, 2, 7 to 12	..	1 to 12	4, 5, 7, 9 to 12	..
	Jhansi	1 to 12	..	4, 8 to 11	1, 10 to 12	..
	Cawnpore	6, 10	..	5 to 8, 10	..	..
	Allahabad	1, 2, 3, 12	..	..	..	..
West	Quetta	1, 5 to 10	..	6 to 10	..	4, 9, 10
	Karachi	5, 9 to 12	..	1 to 12	..	..
South	Ahmednagar	1 to 12	..	6 to 12	1, 11, 12	..
	Mhow	1 to 12	..	1, 2, 3, 10, 12	1, 2, 9 to 12	..

Complaints regarding the unsatisfactory conditions prevailing in areas adjacent and contiguous to cantonment boundaries were more frequent and serious.

These areas are under the aegis of municipal, civil district ("provincial"), railway, frontier ("political") and other authorities. In an anti-malaria sense their condition is seldom, if ever, up to the military standard. Usually they receive no attention at all; and often they are irrigated without any anti-malaria control. As a result the labours of the cantonment anti-malaria officers are frequently vitiated and sometimes rendered useless.

At present this matter is receiving the attention of headquarters; but a solution which will be at once thorough and permanent is far from likely: general backwardness in sanitation, and finance bar the way.

Another factor which militates against efficient field work is the fact that the malaria season coincides with the leave season, and with the hot weather duties in the hills. At no other time is the shortage of superior sanitary personnel more severely felt; and, in 1933, the effects of this shortage were accentuated by the field service operations in Northern Command.

There is no doubt that station anti-malaria field work suffers when officers in charge cannot be ensured security of tenure.

An anti-malaria officer's lot is not always a happy one; and credit is due to him for the admirable way in which he tackles his arduous duties. Happily, senior administrative medical officers are alive to his disabilities and difficulties, and are keen to encourage him in so far as the exigencies of the service permit.

The foregoing remarks indicate the principal factors against which the anti-malaria organization had to fight in the year under review. But, in 1933, there were two important factors in favour of a good malaria year.

Firstly, in 1932, malaria incidence was—for British troops in India—unusually light; "carry over" of infection to the following year was comparatively small. The importance of this as regards the 1933 figures need not be stressed.

Secondly, in 1933 administration of plasmoquine was standardised and general.

In the Report for 1932 it was stated that ".....the tentative opinion is now expressed that the more extensive and intelligent use of plasmoquine is mainly responsible for the fact that 1932 was a record year".

The opinion is now held that, had it not been for the standardised, general use of plasmoquine, the 1933 figures would have been a good deal worse than they actually were.

If Table No. 16 be again referred to, it will be seen that, in 1932, fresh: relapse cases:: 100:71. In 1933 the ratio was 100:30. Taking the mean of the eight years, 1924 to 1931, the proportion of fresh to relapse cases was roughly 100:100.

At this stage it is not desired to make too much of this ratio of fresh to relapse cases. Time must elapse ere it can stand critical analysis. It is influenced by several factors—the personal included—which cannot be statistically controlled with strict accuracy. But, since the issue of

D. M. S. Circular No. Z.-12050/1 (D.M.S. 3) on 10th June 1933* it is probable that the differentiation of fresh and relapse cases is of more value than ever before.

Apart from diagnostic accuracy, a considerable reduction in the relapse rate is confidently to be expected, in view of the carefully controlled results already reported by the Malaria Treatment Centre at Kasauli, by Manifold, Dixon and others†.

In the Report for 1932 (page 109) it was mentioned that a large-scale, controlled trial was in progress, with the object of, ascertaining how the relapse rate of atebrin-plasmoquine treated cases compares with that of patients treated with quinine-plasmoquine.

The results of this trial are now available.

For treatment purposes, two groups were formed, thus:—

A Group—Atebrin, 0.3 grm. for 5 days, followed by plasmoquine, 0.03 grm. for 5 days.

B Group—Atebrin, 0.3 grm. for 7 days, followed by plasmoquine, 0.03 grm. for 5 days.

The scheme with its "follow up", extended over the period 1st April 1933 to 31st May 1934.

	Total No. of cases.	No. of relapses.	Relapse per-centage.
Group A.	594	90	15·2
Group B	407	50	12·3
Groups combined . .	1,001	140	13·9

Concurrently, Indian troops took part in this trial. In their case treatment was the same, except that each Indian patient only received half the plasmoquine dose administered to each British patient, viz., 0.02 grm. on 1st, 3rd and 5th days, and 0.01 grm. on 2nd and 4th days.

But it must be remembered that, in all experiments of this nature, more reliance is to be placed on statistics relating to British than to Indian troops because the latter are so apt to be freshly infected when on leave at their homes‡.

The Indian results were:—

	Total No. of cases.	No. of relapses.	Relapse per-centage.
Group A.	782	92	11·7
Group B.	520	62	11·9
Groups combined . .	1,302	154	11·8

The British and Indian figures, combined gave the following results:—

	Total No. of cases.	No. of relapses.	Relapse per-centage.
Group A.	1,376	182	13·2
Group B.	927	112	12·1
Groups combined . .	2,303	294	12·7

* See page 106 of the Report for 1932.

† See page 108 of the Report for 1932.

‡ The Assistant Director of Hygiene, Northern Command, in his Annual Report, 1933, says: "The incidence in Indian Troops depends very largely on the epidemic level in the districts to which the men go on leave or furlough. Another consideration is the amount of damage these men do on their return to barracks, by acting as reservoirs of infection. This must exercise a profound effect on statistics".

See also page 103 of this (the War Office) Report for 1932.

It is now possible to draw certain general conclusions from evidence obtained by trained observers working on a perfectly controlled and disciplined population.

1. Manifold, Dixon and others have shown that, under the strictest conditions,* quinine-plasmoquine can effect a remarkable reduction in malaria relapse rates.

2. Under general practice conditions this reduction is not so striking. Thus, in 1933 the relapse rate for quinine-plasmoquine was 30 per cent.; but, as this was the first "general practice year", it is not unreasonable to suppose that this figure may improve with familiarity and experience.

3. Atebrin-plasmoquine also effects a remarkable reduction in relapse rates. This reduction, as noted in 1933-34 was not so striking as in para. "1" above; but it was more marked than that referred to in para. "2". This is of some interest, because the conditions under which the trial was made fell midway between those mentioned in paras. 1 and 2: that is, they were not of the strictest, but they were stricter than general practice conditions.

4. Although there is not much in it, still it seems as if the treatment accorded to the group receiving atebrin over 7 days was more efficacious than the treatment administered to the group which received atebrin for 5 days†.

These results secured a place for atebrin on the official list of drugs; and, in appraising them, account must be taken firstly, of the fact that 1933 was a very bad malaria weather year; and secondly, that only first attacks were regarded as fresh: *all* subsequent attacks throughout the period were looked on as relapses. It is therefore certain that some perhaps a considerable number—of so-called relapses were, in reality, reinfections. In other words—in order to eliminate prejudice, optimism and diagnostic error, the compilation of statistics was carried out under conditions which were purposely devised to be as searching as possible. Hence, the figures represent results at their worst.

To summarise—

Since the introduction of the synthetic drugs to Army medical practice in India, the "follow up" method has been applied to individual cases over 12-month periods. By this means—(*a*). It has been made impossible to put too rosy a complexion on the relapse picture. (*b*) It has been proved that the advent of these drugs has brought about a marked reduction in relapse rates.

During the past two years statistics have been collected with the object of showing the seasonal prevalence of malaria in India. An answer was sought to the question: "At what period of the year is the individual most liable to contract a *fresh* infection?"

For this purpose figures relating only to those British soldiers newly-arrived from England, and who had not served in India for more than nine months, were selected. They totalled 759, and they all arrived in India during two successive trooping seasons. (Each trooping season extends from the beginning of October in one year, to the end of March in the following year).

* E.G. The physcians, and the hospitals to which they were attached, were specially selected; and every facility was given to those engaged in the work to make the results as accurate as possible.

† *Cf.* "Treatment of Malaria with Atebrin". McMahon—British Medical Journal, No. 3819, page 477. March 17, 1934.

Only the first attack was taken into account.

The results illustrated the fact that: "Even in individuals taking no quinine it is well known that cases occur where the disease does not manifest itself till long after infection has taken place."* Thus, 28 first attacks manifested themselves in the months of January, February and March; and that these were the outcome of latent infections was evidenced by the findings that 9 of them were malignant in type. April, May and June yielded 112 first attacks. From other evidence, it is more than likely that the bulk of these attacks represented the end point of latent infections carried over from the malaria season of the preceding year.

The remaining cases—619, or 82·5 per cent. of the total—occurred between July and December.

"As a general principle, cases occurring in the second half of the year may be either fresh cases or relapses—while those occurring in the first half are more likely to be relapses."†

It was not possible to determine the comparative seasonal incidence in the different commands, as the numbers at risk in each command were not known.

Total admissions of this series, by months, are shown below:—

January	7	May	43	September	146
February	12	June	45	October	132
March	9	July	61	November	92
April	24	August	124	December	64

Excluding these 759 cases from troops fresh from the United Kingdom there were, in the same period of 24 months, 7,842 admissions for malaria from troops resident in India for more than 9 months. Of these, 80·7 per cent. were admitted in the July-December period.

The peak of the admission rate occurs between mid-September and end of October; but the actual date depends on the type of monsoon in a particular year.

Having in mind the above figures, a pertinent question was put, thus:—"If the synthetic drugs have really reduced the relapse rate, and if fresh infections are unlikely before the month of June (or even before the latter half of that month) what has been the effect of the administration of plasmoquine (1932-33) and of atebrin (1933) on the malaria statistics of the first half of the year 1934?"

The answer to this question is here in the form of a graph (graph No. 1).

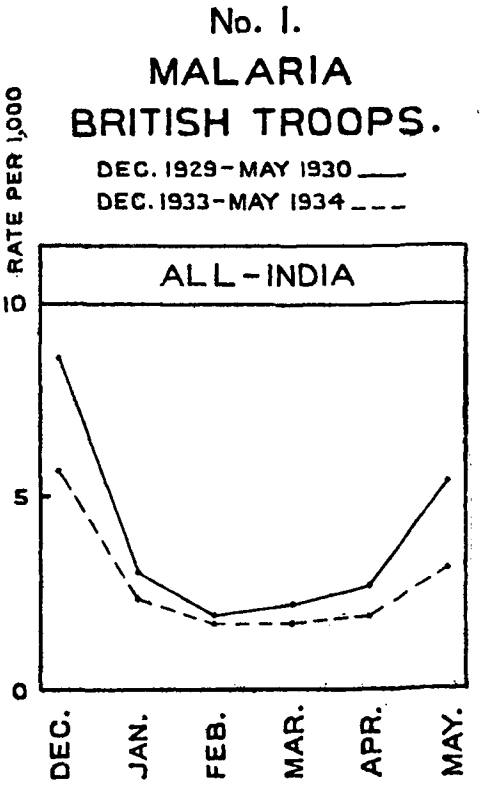
* "Quinine prophylaxis in Nothern India". Young. Journal of the Royal Army Medical Corps. August to December 1933.

Although Major Young prolonged his period of observation for as long as possible, it is nevertheless true that his longest "follow-up" was insufficient for the purpose in view. It ended on 30th November 1926; if exigencies had permitted it ought to have been continued until 31st May, 1927, at least.

† D. M. S. Circular No. 12050/1 (D. M. S. 3) of 10 June, 1933.

See also the leading article in the American Journal of Hygiene. Vol. 17. No. 1. January, 1933.

and with no comment beyond this: that those who think "that the time has not yet come when any of these drugs (the new synthetic remedies) can be recommended fas substitutes for, or in preference to, quinine"‡ are in a minority in Army medical circles in India.



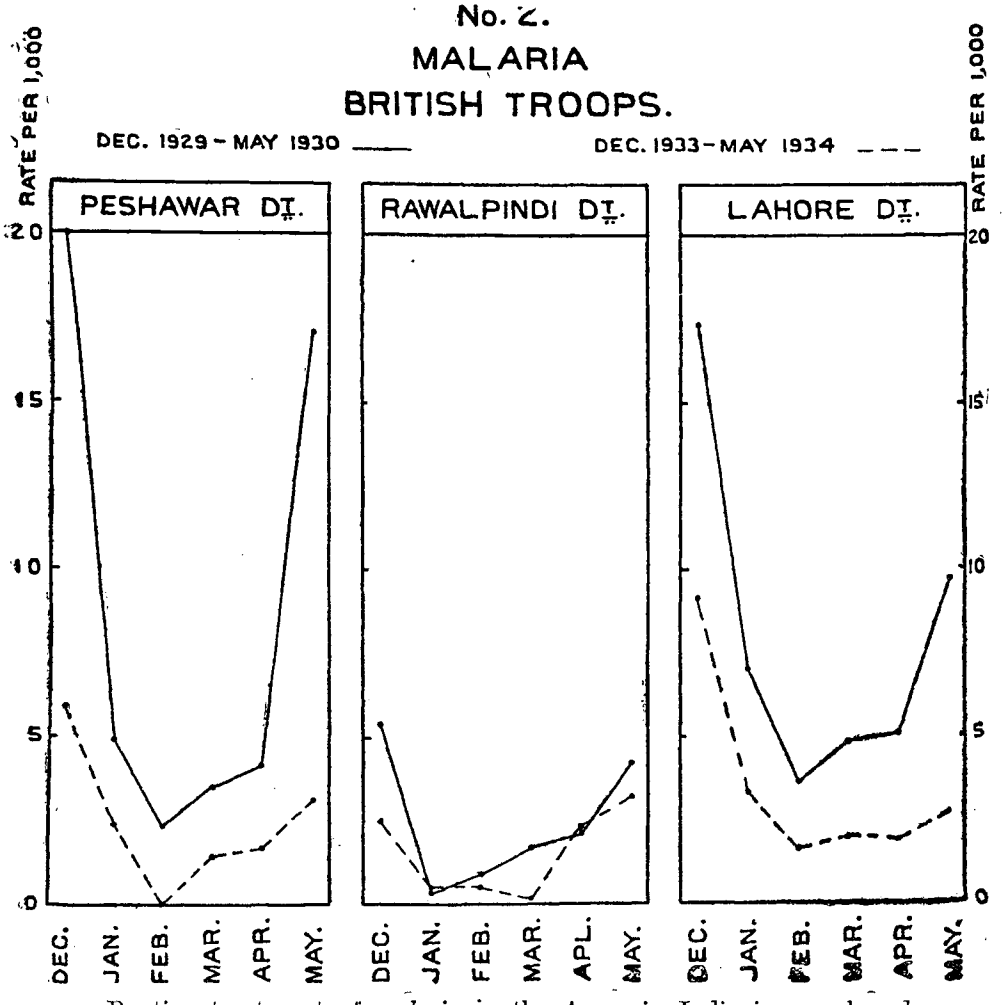
It is true that time is an upsetting factor in malaria: short-term prophecy and impression are dangerous; and this graph (graph No. 1) only shows the end-result of a spell of two years' work. It may be bold to say: "Here then is the result of the new synthetic drugs"; but it would be bolder still to assert that this result could have been achieved by means of quinine alone.

It will be noticed that the graph is not printed merely to emphasise that there were more actual relapses between December 1929 and May 1930 than between December 1933 and May 1934; but to demonstrate the absence of parallelism in these two periods: to show that, proportionately, relapses were fewer in the latter period than in the former.

Similar graphs (No. 2) have also been prepared for Lahore, Rawalpindi and Peshawar Districts, Northern Command. The feature is not well seen in the Rawalpindi graphs; but in the other two districts it is marked. The case of Peshawar District is of particular interest because, in 1933, no so-called prophylactic quinine was administered; whereas 1928

‡Quarterly Bulletin of the Health Organisation of the League of Nations. Vol. II No. 2. Geneva, June, 1933.

was the third and last year of the large-scale experiment already referred to. In that year Major Young's records ended on 31st October. Had he been able to carry them on until 31st May 1929, his conclusions on the matter would have been less favourable.



Routine treatment of malaria in the Army in India is now based on the following scheme:—*

I. Benign tertian malaria—

(*a*) Quinine, grs. 20, with plasmoquine 0·03 grm. daily, for 21 days.

Or

(*b*) Atebrin, 0·3 grm. daily for 7 days, followed by plasmoquine, 0·03 grm. daily, for 5 days.

II. Malignant tertian malaria—

(*a*) Treatment is by quinine, as the case indicates, with a course of plasmoquine (0·03 grm. for 5 days) during convalescence.

* D. M. S. Circular No. Z-10453/43 (D. M. S. 3) of 25th June 1934; and No. Z-9295/30 (D. M. S. 3) of 27th April 1933.

If necessary (*e.g.*, if crescents be found in thick smears) a repeat course of plasmoquine may be given later.

Or

(*b*) As in "I(*b*)" above.

Medical officers are, however, allowed much latitude in dealing with this form of malaria; and are encouraged to adopt more drastic measures whenever clinical conditions indicate a severe form of the disease.

III. Quartan malaria—

As in "I(*b*)" above.

Indian patients are also treated as above described—except that they receive only two-thirds of the British dose of plasmoquine, *viz.*, 0·02 grm. daily, administered in 0·01 grm. doses, morning and evening.

It will be noticed that the atebrin-plasmoquine course extends over 12 days, and the quinine-plasmoquine course over 21 days. It is proposed in 1934 to carry out a large-scale trial, with a view to reduction of the latter course to 14 days and—if the trial is successful—to an even shorter period. Nevertheless, there is a limit to cutting down the period of treatment; and on this point military medical authority in India is in agreement with the conclusions arrived at by Major William B. Borden, Medical Corps, U. S. Army.†

(Troops in Panama.) ". . . . cases of malaria treated in hospitals or that . . . . . the longer the duration of treatment in hospital or quarters regardless of any out-patient treatment which may have been given, the lower the percentages of relapses".

(Troops in Panama.) ". . . . .cases of malaria treated in hospitals or quarters for one week or less showed a much larger percentage of relapses than did those who were treated for longer periods. . . . . "

(Troops in the Phillippine Islands).—"The number of relapses from tertian malaria was higher among both white and native troops for those who received the shorter course of quinine treatment in hospital and quarters".

This, and the therapeutic practice described above, is far removed from the line of action sponsored by the Malaria Commission of the League of Nations.* To write a commentary worthy of this subject would be to undertake a thesis of a kind foreign to this Report. But, as many Army medical officers have studied the Malaria Commission's report, and have asked questions thereon, it appears desirable to epitomise the reasons why military medical practice in India is at variance with the Commisson's recommendations.

1. The Commission sets out to deal with poor, settled, civilian, indigenous communities, Military medicine in India is concerned with costly, nomadic, military forces alien to the soil. Even the Indian soldier is seldom indigenous to the places in which most of his service is spent.

The Commission's sole aim is fundamentally different from that of military medical authority in India; and it is on this fundamental difference that differences in therapeutic practice rest.

† "A Study of Malarial Relapses in the United States Army". The American Journal of Hygiene. Vol. 17. No. 1. January, 1933.

* Quarterly Bulletin of the Health Organisation of the League of Natonsi. Vol. II, No. 2. Geneva, June 1933.

2. Treatment of the patients who are within the Commissioner's purview is "an economic rather than a medical problem," whereby† recourse to totaquina, or similar products, is a necessity.

This is not so when medical authority is faced with the exigencies of military service—most pronounced in the case of expensive, short-service British troops in the tropics.

It is impossible for the military epidemiologist to take advantage of the fact that "..... persons who suffer repeatedly from malaria gradually acquire a tolerance or immunity to the disease"; and he cannot profit by the finding that "..... by too intensive and too early treatment with quinine the patient may be prevented from acquiring that tolerance and so may continue to suffer for a very long period from the relapses which are such a troublesome and debilitating feature of malarial fever", To learn that "..... tolerance is specific to the particular species and strain of parasite concerned" only calls for yet earlier and still more intensive treatment, because although the soldier patient is in Manzai today, he was in Madras yesterday, and he will be in Mandalay tomorrow and in Manchester the day after.

Time (short service), expense (hospitalisation) and force (effective rifle strength) all combine to preclude any attempt at developing natural immunity; and these arguments which are especially applicable to British troops, are also applicable to Indian troops—only, in a slightly lesser degree.

3. Perhaps the most striking difference between Army medical practice in India, and the Commission's recommendations is found in the two related quotations which read as follows:—

"The Commission considers that curative doses of quinine or of atebrin for treatment of an attack should not be continued longer than seven days, and that treatment for five days will often suffice".

Again—

"For this and other reasons which are stated in the report, the Commission does not consider that it is in the best interests of the patients to endeavour to combine a plan of treatment designed for the prevention of relapses with a plan having for its object the clinical cure of an acute attack. They believe that treatment designed to prevent relapses should not be begun until at least a week has elapsed since recovery from the acute (primary) attack".

Here again the Commission is aiming at the induction and strengthening of the individual's natural powers of resistance.

It has already been explained why the Army cannot afford to follow that line.

The Army physician is taught to attack the disease at once, with the most powerful drugs at his disposal, and as intensively as the dictates of safety will permit. He attempts to follow up cure of the attack—primary or relapse—with therapeutic prevention of subsequent relapse attacks, and this without any interval between "cure" and "preventive" medication.

The remarkable success which has attended this plan under particularly favourable conditions, has already been proved beyond doubt, and recorded in these pages. The modified, though nevertheless gratifying, success which has attended this plan under "general practice" conditions holds out promise of still better things to come.

† Quotations are extracts from the Commission's report.

In some other respects it is not possible for military medical authority in India to agree unreservedly with the Commission's opinions. For example, it is thought that the efficacy of the new synthetic drugs has been rated too low; and, in the case of plasmoquine at any rate, it is considered that justice has not been done.

With the Commission's dicta regarding the prophylactic (sic) action of quinine and other anti-malarial drugs, military medical opinion in India is in full accord. In this connection the word "prophylactic" has now gone out of fashion: it has been replaced by the more exact term, "delay action".

There is, herein, no intention whatever of questioning the Commission's findings. It is merely desired to point out why military medicine in India cannot accept the resultant recommendations; and it is believed that the Commission would be the first to acknowledge the right—indeed, the duty—of those who differ to make plain their divergencies. Over and over again the Commission state that no panacea exists. "..... the Commission has drawn particular attention to the discovery that the therapeutics of malaria, like every other aspect of the disease, is much more a local and individual problem than has hitherto been thought. ...."

Before closing these remarks on the therapeutics of malaria, it is well to sound a note of warning. This cannot be better done than by quoting from page 161 of the Tropical Diseases Bulletin, Vol. 31, No. 3, March 1934.* ". . . . . disconcerting though it be, there is today no known method of eradicating malaria in the tropics promptly, at a cost within the means of the people; but, given plenty of money, effective control can be accomplished, despite all handicaps, in a relatively short time. On the other hand, with plenty of time it should be possible to control malaria without spending much money, provided the will to control is present. Mosquito control gives much better results than drug control. Though quinine has saved many lives, there are few if any records of successful malaria control by the use of drugs alone".

Finally it is desired heartily to endorse the criticisms and opinions expressed by Dr. A. Dubois.* His views are supported by military malariologists throughout India.

Between 30th August 1932, and 13th August 1933, ten cases of haemoglobinuria, with six deaths, were reported. These included five cases, with two deaths, at Quetta, between 2nd and 11th August 1933.

All cases occurred on the North-West and Western Frontier, and all were Indians. All were under treatment for malaria, and all of them received plasmoquine. In some cases quinine was administered, and in others atebrin.

As regards the plasmoquine:—

In no case did the daily dose exceed 0·03 grm., and in no case was the drug administered for a longer period than six days.

In every case—even in the fatal cases—the drug was stopped at the first sign of toxicity.

* A short review of "Lectures on Malaria Prophylaxis and Mosquito Control". by Paul F. Russell. Published in the Journal Phillippine Islands Med. Association. Vol. 13. 1933.

* Le traitement du paludisme selon la Commission de la S. D. N. Bruxelles. Med. 1933. Sep. 10. Vol. 13. No. 45. Pages 1301-1308.

What part was played by malaria and (or) plasmoquine was not determined; and, since August 1933, no more cases have been reported.

There is no doubt that some extraneous factor was at work; but what that factor was remains a mystery.

These cases were fully described and discussed under the title "Haemoglobinuria" in the Journal of the Royal Army Medical Corps, issues of March, April, and May, 1934.

In September 1933, a decision to close the Malaria Treatment Centre was announced in the following words:—

"After careful consideration it has been decided to abolish the Malaria Treatment Centre at Kasauli from the end of the present financial year.

Owing in large measure to the methods of treatment which have been built up on the results obtained at this Centre, the type of malaria case with which the centre at one time was flooded has practically ceased to exist. The number of patients reaching the centre is declining year by year and this in spite of repeated requests to Commands that suitable cases should be sent to Kasauli for treatment. Under present circumstances it is felt that no useful purpose will be served by continuing the Centre in its present form; but in closing it we have the satisfaction of knowing that it ceases to exist chiefly because of the success of its own efforts".

The Centre closed on 28th February 1934.

The section on Malaria will be concluded with a few remarks of local interest.

In Northern Command the relapse rate has fallen from 50 to 40 admissions per 1,000 of strength. This fall would have been more marked if the command had enjoyed peace conditions. Field service operations at the worst part of the year entail heavy and repeated infections and, in some cases, inadequate treatment.

Approximately, a quarter of a million mosquitoes were trapped in the Peshawar barracks. Trapping was also tried out with success at Bannu. The value of this measure is enhanced when it is employed in barracks adjacent to breeding grounds which cannot be effectively controlled.

At Kohat the incidence of the disease shows a distinct tendency to diminish, and the mosquito-proofing of the McQueen Lines has probably played an important part in this most desirable result.

A comparatively large number of fresh infections were reported from the hill station of Razmak. No doubt the bulk of these represent infections of troops on detached duty at Bannu and Dera Ismail Khan.

At Lahore senior Boy Scouts were trained in Anti-malaria measures, and did good work in the sadar bazar area.

In Eastern Command the improvement in the Malaria statistics would have been remarkable, had it not been for adverse conditions in Delhi. The ratios per 1,000 for this station are disturbing: they show a deterioration of the situation thus—

1929 . . .	114·3
1930 . . .	191·4
1931 . . .	200·4
1932 . . .	193·3
1933 . . .	**309·4**

The situation in Western Command also gives rise to anxiety. Here the per mille figures were:—

1929	130·9
1930	92·8
1931	140·8
1932	131·1
1933	**204·0**

Temporarily, at least, this command has lost the reputation for salubrity which it formerly enjoyed.

In Southern Command, Jubbulpore and Mhow—formerly the two worst stations in the command—were placed 7th and 3rd respectively in the incidence table. Trained anti-malaria officers have been in charge of these two stations for some years, and it would seem that their labours are at last bearing fruit.

The problem of malaria in India, in all its many facts, is of never-failing interest. This interest, to sanitarians and clinicians alike, was fully maintained during the year under review. However, in this field of medical activity caution is a desirable quality; and it may be well to allow Mr. Jorrocks to write the epitaph of 1933, thus:—"Far be it from me to say that you will be much wiser from anything you have heard, for the old stager will find nothing but what he knew before, while all that can be taught the beginner is not to be too sanguinary in his expectations".

Plague.

12. This tropical scourge, like cholera, makes its appearance in the pages of Indian sanitary reports with a fair degree of regularity; but nowadays, in British health reports, it is an uncommon subject.

A severe epidemic of the disease occurred in the Bombay Presidency, and notably in the civil-municipal areas, Poona.

These areas surround, are contiguous to, and are even thrust well within, the cantonment area.

Early in August a very virulent and severe outbreak occurred in the village of Ghorpuri. This village was not under military control, and its position as regards the troops' quarters was most dangerous. The villagers refused to co-operate in the anti-plague measures advised.

On the 24th of August dead plague infected rats were found inside the cantonment boundary. By the middle of September all troops had been inoculated against infection.

Regimental and cantonment rat extermination squads were trained and set to work on an intensive anti-rodent campaign. Trapping was not found to be nearly as successful as baiting: "Common sense" rat bait and barium carbonate were used.

Kirkee cantonment, near Poona, also became infected, but less severely.

Gradually redent infection spread: dead infected rats and squirrels were found all over Poona cantonment.

The epidemic began in the city of Poona in January 1933. It smouldered on through the hot weather, and flared to its height in August, September and October. Before the plague exodus took place, the population numbered 160,000. A conservative estimate, up to the end of November, puts the number of attacks at 1,400, with 984 deaths.

In the cantonment, between 30th September and 28th November 1933, the following cases occurred:—

Troops	6
Followers	6
Families	2
	14

Eleven of these cases terminated fatally.

All these patients were Indians.

No British personnel contracted the infection.

It is hoped to publish elsewhere a full account of this outbreak: it contains much of interest. There is no doubt that, but for the energy and enthusiasm displayed by the medical and executive officers in charge of this alarming epidemic, the results would have been very different, and probably very disastrous.

Rabies and prophylactic anti-rabic inoculation.

13. No comments on this subject have been made in this report for some years.

Table 21 shows the number of cases that have occurred among all ranks, British and Indians, and their families, in the last five years:—

TABLE No. 21.

	1929.	1930.	1931.	1932.	1933.
B. O. Rs.	1	4	..	..	..
I. O. Rs.	..	1	4	3	2
Officers, Women and Children .	..	1	1	..	1
Total . .	1	6	5	3	3

Prophylactic anti-rabic inoculation has now been almost completely decentralised from Pasteur Institutes.

Military anti-rabic centres exist in all the larger stations, except a few in which convenient civil centres are established.

Carbolised vaccine is obtained by military centres from the nearest Pasteur Institutes. The system of dosage has not been finally standardised, and military centres conform to the practice of the institutes from which their vaccine is obtained. For statistical purposes comprehensive details are obtained in every case and supplied to the parent institute.

This system has proved very satisfactory, and in every way preferable to the old system of despatching individuals often under the most trying weather conditions, to distant Pasteur Institutes.

Command and District Laboratories now undertake the examination of the brains of suspected rabid dogs.

Small-Pox.

14. Half-yearly vaccination state of British troops and families.

TABLE No. 22.

	Percentage Protected.*	
	On 31st March.	On 30th September.
British officers	98·37	98·50
British Other Ranks	99·30	99·31
Wives and Children	98·84	97·87

This high rate of protection did not afford absolute immunity to the British military population. Cases of small-pox occurred as follows:—

Amongst officers (3), their wives (1) and children (1) ... 5

Amongst other ranks (13), their wives (3), and children (4) 20

The cases were scattered over the length and breadth of India. They came from 14 different cantonments. In no instance did anything in the nature of an epidemic occur.

Amongst the civil population the disease was epidemic, and caused a huge mortality thus:—

No. of deaths, all-India, amongst civilians quarter ending 31st March 1933	31,754
No. of deaths, all-India, amongst civilians quarter ending 30th June 1933	48,370
No. of deaths, all-India, amongst civilians quarter ending 30th September 1933	11,689
No. of deaths, all-India, amongst civilians quarter ending 31st December 1933	8,950

And, be it noted, these are conservative, and in some respects incomplete, computations.

Tuberculosi

TABLE No. 23.

	Pulmonary Tubercle.	Tuberculosis of organs other than the lungs.	Pulmonary tubercle.
	Actuals.	Actuals.	Ratio per 1,000.
Admissions	46	9	0·8
Deaths	2	1	0·04
Invalids	49	12	0·89

These figures are an improvement on those of last year: the disease continues its steady, if slow, decline.

* That is—

(*a*) has been successfully vaccinated within the last five years, or

(*b*) shows evidence of immunity by 3 unsuccessful vaccinations (carried out at intervals of one month) within the last five years.

(*c*) bears distinct marks of smallpox.

Venereal Diseases.

16. The following is a list of the bigger stations in which admissions exceeded 50 per 1,000:—

TABLE NO. 24.

Station.		Ratio.
Madras	(Southern Command)	97·6
Mingaladon	(Burma District)	83·3
Cawnpore	(Eastern Command)	73·2
Barrackpore	(Eastern Command)	71·7
Delhi	(Eastern Command)	64·5
Maymyo	(Burma District)	63·5
Bangalore	(Southern Command)	60·2
Ambala	(Northern Command)	52·9
Agra	(Eastern Command)	51·8

The all-India ratio per 1,000 was 33·4. In 1932 it was 37·7. How far the reduction was due to economic and financial stress cannot be surmised, since this factor acts equally on the soldier as a deterrent, and on his partner as an incentive.

The incidence of each member of the group, in ratios per 1,000 was:—

Gonorrhoea, 23·2; syphilis, 4·9; and soft chancre, 5·0.

For gonorrhoea, the average stay of each patient in hospital was 47·75 days; and the relapse percentage was 13·50. Generally speaking, the longer the patient remained in hospital on his original admission, the less likely was he to relapse. The longest stay in hospital occurred in Poona District: 66 days on an average; and here the relapse rate was 10 per cent.

During the course of the year Stabismol, Hypoloid Bismuth Metal, Thiosarmine and Solu-salvarsansan were tried out and reported on.

In his remarks on soft chancre, the Specialist at Poona reported as follows:—

"During the month of December Bacillus Ducrey Vaccine (Dmelcos) was administered intraveneously to two cases of soft chancre with bubces. The results were dramatic. The sores, which were in both cases small, healed, and the buboes subsided, in 7 and 9 days respectively after the first administration of the vaccine, and only two injections were found necessary. A sharp reaction occurred in both cases after the first injections, temperatures rising to 105° and 103°; but the patients felt very little general disturbance, and reactions after the second injections were comparatively mild. It is proposed to continue the employment of this vaccine."

Diseases of the Respiratory System

17. Actual admissions were 1,198, giving a per mille ratio of 21·8. In 1932 this ratio was 25·3.

Acute and chronic bronchitis, and catarrhal pneumonia accounted for 800 admissions, with 4 deaths and 9 invalidings. There were 113 cases of pleurisy, and 47 of laryngitis.

Lobar pneumonia.

	1933.	1932.
Actual admissions	142	187
Admission ratio per 1,000	2·6	3·4
Actual deaths	11	24
Case mortality per cent.	7·7	12·8
Actuals invalids	6	2

Diseases of the Digestive System.

18. Admissions again showed a decrease: 5,670 in 1933 as against 5,752 in 1932. They included:—

Tonsillitis	1,777	Appendicitis	389
Diarrhœa	842	Pharyngitis	377
Jaundice	392	Constipation	323
		Gastritis	289

Diseases of the Areolar Tissues, and Local Injuries.

19. Once more these two groups accounted for much hospitalisation.

In the former, admissions totalled 2,929, with a ratio per 1,000 of 53·3. There were 2,478 cases of cellulitis and 403 of boils.

In the latter, admissions amounted to 3,313, with 29 deaths, giving ratios per 1,000 of 60·2 and 0·53 respectively. The injuries included sprains, contusions and abrasions, 1,899: wounds, 292: gun-shot wounds, 50: fractures, 694, and dislocations 120.

Effects of Heat.

20. Comparatively speaking, 1933 was a good year for British troops in India. Admissions numbered 109, and deaths 11, with ratios per 1,000 of 2·0 and 0·2 respectively. There were 20 cases of heatstroke, and 89 of heat exhaustion. All these figures are very much below those of 1932.

In May 1933, a circular was issued which contained a résumé of an analysis of 160 case sheets of patients diagnosed under the heading of "Effects of Heat".* The cases occurred in Northern and Eastern Commands in 1932.

Deformities of the foot.

21. In this group the 1933 record was not as good as that of 1932. There were 50 admissions and 20 invalidings, as against 41 and 14 respectively, in 1932. The admissions included 22 cases of hammertoe, and 14 due to flat foot.

Special Departments.

22. The Warren-Fisher Committee alluded to an impression which was said to be prevalent in medical schools in the United Kingdom; to wit, that service in the Royal Army Medical Corps was lacking—comparatively speaking—in professional interest. The Army fails to provide sufficient clinical material for the keen young doctor. The Committee believed this impression to be founded on fact.

* See also Journal, Royal Army Medical Corps. Vol. LXII. No. 2, Page 129.

Since publication of the Committee's Report, the above impression has been reiterated, and the belief upheld, in a number of influential quarters.

The keen practitioner in India is mystified by these assertions: he has never been impressed by a paucity of professional work, and he has never lacked clinical material. He has often been overwhelmed by professional work and clogged by clinical material.

No doubt conditions in the United Kingdom are different; but perusal of the annual reports of the special departments, 1933, justify the statement that any young medical man who is athirst for high class work need only serve in India. Here he will get as much as he can possibly desire—and more.

Medicine.

The medical specialists' reports showed that plenty of work of a very high standard was accomplished; and that the physicians are a progressive, "live" set of officers. The reports abound in interest; but they are too detailed and diverse to permit of quotation here. The therapeutics of malaria received special attention: careful trials and observations were made and intelligently recorded and commented on. Psychological medicine also received increased attention. In this field the post-War Army seems to provide much more material than did the Army of twenty years ago.

The reports received from Quetta and Rawalpindi were of particular interest and value.

Mental Diseases.

During 1933 there were three specialists in India dealing with this class of disease.

The Mental Section at Deolali was moved to Colaba. The change has been an administrative success.

The following is extracted from the report made by the Officer in charge of this Section:—

"Number of admissions to the Section in—

1929	15
1930	20
1931	38
1932	42
1933	**56**

Forty-three of the 1933 patients fell into the age-group 20—25.

Forty-one of these patients belonged to disease groups in which one might expect to find an underlying cause dating back to infancy or early life.

It has been suggested that we are now beginning to feel the effect of the War years on the youth of the nation; and the present incidence rate is so suggestive, that particular attention will be paid to this aspect during 1934".

Surgery.

The general remarks made above on the subject of Medicine as a speciality also apply to Surgery.

A total of 3,140 operations were reported, of which 1,412 were "major", and 1,728 "minor". These figures, however, do not include emergency and minor operations performed by general duty officers.

Reports were received from 25 stations and districts, relative to surgical work amongst British and Indian troops.

As regards equipment, eight of the surgeons declared themselves satisfied, or made no remarks. Seven were satisfied, with reservations: they suggested a few additional articles. Eight were critical, and submitted somewhat lengthy lists of articles which they considered should be supplied to operating theatres. The articles in each list were not, of course, all alike, so that the aggregate was considerable.

Authority for modernising and completing surgical equipment was given under a D. M. S.'s Circular issued in November 1931. To this circular was appended a new list of instruments and appliances. In the compilation of this list great care had been taken, and the best expert opinion and advice had been obtained before the list was passed for publication. It was considered that the new instruments and appliances would meet any reasonable requirements for some years to come.

Surgeons who demand articles different from, or additional to, those now authorised must obtain such articles by cash purchases, payments being made from the "local purchase" funds controlled by the officers commanding the hospitals to which the surgeons are attached.

It is recognised that, so long as surgeons are trained in different medical schools, and surgery advances, criticism of any standardised list, however complete, is inevitable. That is the price of individualism and progress. The cure is periodical revision, and this remedy will be applied in due course.

Radiology.

Further progress has been made in the modernization of X-ray equipment ,and of 34 sets now in use only three are coil sets. New combined couches and screening stands are being provided and steps are being taken to bring the equipment of electro-therapy department up to modern requirements. Self-protected tubes have gradually replaced the Coolidge and Muller types previously in use. The following is a summary* of the X-ray examinations carried out during the year.

TABLE No. 25.

No. of patients examined		British	12,614
		Indian	7,953
		Civilian	1,545
No. and nature of examinations carried out	Bones and Joints	Injury	13,779
		Disease	2,168
		Sinuses	683
	Teeth		978
	Lungs		2,357
	Heart		136
	Gastro intestinal		405
	Liver and gall bladder		292
	Urinary tract		763
	Genital tract		60
	Miscellaneous		311
	Foreign body		76

*Table No. 25.

TABLE 25—*contd.*

Cases in which a contrast medium was used and nature of medium.	Barium	528
	Shadacol	64
	Other media	43
Miscellaneous information	No. of ordinary films used	32,625
	No. of dental fil s	3,072
	No. of exposures	44,022
	No. of prints	183
	No. of screen exami tions	885

Anaesthetics.

Avertin, Pernocton and Evipan Sodium were tried out and recommended by different anaesthetists.

The prevailing note in reports sent in by the specialists was that of dissatisfaction with the present scale of equipment. This matter is receiving consideration.

Dental Treatment.

During 1933 personnel consisted of:—

1 Assistant Director of Medical Services (Dental).
23 Dental officers.
16 Dental mechanics.
23 Dental clerk-orderlies.

A new surgery was constructed at Lucknow; but at four of the centres urgent constructional work could not be proceeded with on account of lack of funds.

Drafts from the United Kingdom arrived in good dental condition.

Summaries of dental treatment, 1933;—

TABLE No. 26.

Comparative summary of dental treatment carried out during the year 1933 for British Troops in India (including Royal Air Force).

Year.	No. inspected.	No. selected for treatment.	No. for whom treatment was completed.	No. of teeth extracted.	No. of teeth conserved including root treatment.	Scalings completed.	Treatment for Gingivitis, stomatitis and pyorrhoea.	New dentures supplied.	Dentures remodelled and repaired.	Appliances for jaw injuries
1932. . .	18,361	13,650	14,879	13,984	*32,456	5,680	758	770	388	29
1933. . .	**19,979**	**15,118**	**15,766**	**14,879**	@33,650	**6,112**	**752**	**867**	**439**	**24**

Comparative summary of Dental Treatment carried out during the year 1933 for the families of British other ranks (including Royal Air Force).

TABLE No. 27.

Year.	No. of teeth conserved.	No. of teeth extracted.	Scalings.	Treatment for gingivitis, stomatitis and pyorrhoea.
1932 . . .	3,434	4,034	600	136
1933 . . .	**3,042**	**4,087**	**469**	**76**

* Includes 388 with root treatment.
@ Includes 190 with root treatment.

Analysis of summary of dental treatment carried out during the year 1933 (for British Troops in India, including Royal Air Force.)

TABLE No. 28.

	1933.	1932.	Increase.	Decrease.
Number for whom treatment was completed	15,766	14,879	887	...
Percentage inspected found to require treatment	75%	74%	1%	...
Average number of teeth conserved per patient	2·2	2·2	..	...
Average number of teeth extracted per patient	0 98	0·94	...	...
Treatment for gingivitis, stomatitis and pyorrhea	752	758	..	6
Percentage treated supplied with artificial dentures	5%	5%	..	..
Number of dentures remodelled and repaired	439	388	51	..
Appliances for fractured mandible and maxilla	24	29	..	5

Diseases of Women and Children.

In this department there was no lack of specialised as well as of routine work. The reports made interesting reading.

With regard to ordnance and medical equipment (which is all standardised) eight specialists rendered favourable reports, four made no mention of the subject and one—the unlucky thirteenth—declared himself to be far from satisfied.

Mother and Child Welfare.

This work is organised, and more or less active, in the following number of cantonments:—

	Families of British Troops.	Families of Indian Troops.
In Northern Command	11	18
In Southern Command	16	14
In Eastern Command	9	15
In Western Command	3	3
In Burma District	2	2
Total	41	52

Methods and standards vary greatly from high efficiency in Quetta, Lahore and Kirkee (to mention some of the British centres) down to more humble efforts in the smaller stations.

The movement continues to make remarkable progress in the lines of Indian troops' families, despite the fact that no government grant-in-aid is given for welfare work.

The official report on this subject is published by the Maternity and Child Welfare Bureau of the Indian Red Cross Society, under the direction of which the work is now carried on.

Ophthalmology.

The enlistment of Indian recruits suffering from mild trachoma has proved to be a step in the right direction; and the policy is extending in other ways. Thus, the specialist in Poona reports:—

"It is interesting to note that, prior to my first visit in 1932, boys of King George's Royal Indian Military School, Ajmer, suffering from trachoma, were segregated from their healthy comrades.

This practice was discontinued, and the trachoma cases mixed freely with the others. Precautions were taken by the school authorities: each trachoma patient had his own towel, soap, etc., and care was taken to ensure that no interchange of these articles between the boys took place.

That segregation was unnecessary has been proved by the fact that, during the year, not a single fresh case of trachoma has occurred amongst the school boys. No doubt this result was due, in large measure, to the precautions taken to prevent spread, and to the thorough way in which treatment was carried out. At the same time I consider it was also due, in part, to the fact that, in India at least, trachoma is not such an acutely contagious disease as one was previously led to believe."

Command specialists are satisfied with the equipment supplied to their centres.

Ear, Nose and Throat Departments.

There is a centre in each Command where the bulk of the work is done. The specialists also pay touring visits to the out-stations.

Re-equipment of these departments is not yet completed, and the specialists have commented adversely on this point.

Hygiene (General)

23. *Rations.*—The Specialist in Hygiene, Bombay District, submitted an instructive report on the feeding of British troops in his area. The report concluded thus:—"I hope a case has been made for favourable consideration of some increase either in the quantity of rations issued, or for some small addition to the monetary messing allowance".

Commenting on this, the Deputy Director of Medical Services, Southern Command, remarked: "It would appear that the ration is not sufficient, especially for extra exertion, *e.g.*, during brigade training manoeuvres".

This matter is under examination; but—as the reporting officer indicated—the key to an adequate and well balanced calorie and vitamin content in a dietary is to be found within the unit itself. It is reasonably certain that, if the unit's messing officer is interested and instructed, the British soldier's feeding will be well up to standard requirements.

Unfortunately, good messing officers are not always available.

The method of preparing an antiscorbutic drink from the expressed juice of germinated pulses received further attention, but was abandoned, as it was found that the preparation rapidly deteriorated and lost its special properties.

Military Food Laboratory: Summary of work carried out during 1933.

TABLE No. 29.

Source of sample.	Number of samples received.	Accepted.	Rejected.	Percentage of rejections.
On offer or for acceptance.				
Direct from overseas . .	646	583	55	8·5
Indian products . . .	577	439	134	20·7
Grains from grain depots .	2,945	2,841	104	3·5
Wheat products from controlled mills	625	625	..	..
Bran from other controlled mills	616	538	78	12·7
Ghi	4,141	3,987	154	3·7
From I. A. S. C. stocks for periodical analysis . .	1,595	1,565	30	1·9
From units on complaint or for advice	1,417	1,151	219	15·5
Totals .	12,562	11,729	774	6·2

The staff of this laboratory is highly trained and organised; but when it is added that it consists of but one officer and nine other ranks, it will be realised that it does not waste its time.

Most of the work done by this institution is on behalf of the Army Contracts' Directorate. Analyses are also carried out for the Indian Army Service Corps; and lately it has been decided that, when required by proper authority, examinations of foodstuffs supplied by the Canteen Contractors' Syndicate shall also be carried out.

Reverting to the above table, it will be noticed that the total of columns 3 and 4 (12,503) is less by 59 than the total of column 2 (12,562). This figure represents the following special examinations:—

Of articles for "hard" and "emergency" rations	12
Of certain samples of *ghi*	6
Of certain samples of drinking water	41

In addition to these activities, and in conjunction with the Enteric Laboratory, the Military Food Laboratory undertakes certain special and important investigations on behalf of the Medical Directorate, Army Headquarters. For example, during 1933 a lengthy and elaborate enquiry was made into the chloramine process of water sterilisation in the field. This resulted in a valuable and definite report, for which much credit is due to the Officer in charge of these two laboratories.

Clothing.—In the course of numerous and important trials on the heat insulation properties of aluminium foil lining, the Specialist in Hygiene, Rawalpindi District, advocated the lining of troops' helmets. Specimen helmets have been submitted for inspection and trial by the Ordnance (clothing) authorities.

Sanitary Engineering.

Works.—Building and similar works carried out by the Military Engineering Services were characterised more by their diversity than by their importance or scope. Demands for new buildings, for additions,

alterations and improvements were clamant, but financial stringency remained the determining factor. It is noticeable that, in recent years, annual reports received from Districts and Commands contain under the above heading many trivial items which, in more affluent years, would not have been deemed worthy of mention.

Water supplies.—During the year under review further new works and improvements to water supplies have been carried out. There are, however, many stations in which, owing to financial stringency, it has not yet been possible to provide piped water supplies.

Chloronomes have been provided as funds have permitted and, in the majority of piped water supplies, these are now installed. Their operation is carried out by the Military Engineer Services, under the supervision of medical authorities who give the necessary instructions as to quantities of chlorine to be administered.

Steel tanks have been painted internally with Rosbonite or Bituros solutions, which have been found to give satisfactory results against corrosion by chlorine.

Electric lighting and ventilation.—Further progress has been made in providing electric lighting in military cantonments and nearly all plains stations where British Troops are quartered are now illuminated electrically and provided with electric fans or electrically driven pankhas.

It has not yet been possible to provide Indian troops lines with electric lighting except in a few special cases chiefly on the Frontier.

Hill stations with one or two exceptions are not yet provided with electric lighting.

Air Conditioning.—Trials of small air cooling and conditioning apparatus for use in hospitals were carried out. The apparatus, however, is expensive and running charges considerable, so that it has not been possible to adopt it for general use.

Refrigerators.—A few domestic refrigerator cabinets have been authorised for use in certain hospital laboratories.

Owing to paucity of funds, it has not yet been possible to authorise these for hospitals in general.

Fly-proofing.—Works of a sanitary nature, such as fly-proofing, dust proofing, etc., have been authorised, where considered necessary on sanitary grounds.

Fly-proofing has been specially carried out in Baluchistan in various buildings.

Conservancy.—As was noted in 1932, there is an increasing tendency to instal the water carriage system of sewage disposal, usually combined with small, self-contained "septic tank" installations. So far this system has made most progress in Northern Command; but its provision has been authorised in all cases of new construction or reconstruction, after 1st April 1934, of British type quarters in stations where conditions are suitable.

This marks a definite advance; and, if eventually it proves to be as successful as its initiation promises, it will deserve to be regarded as an historical event in the story of sanitation in India.

It may therefore be of interest to place on record the position in 1933.

TABLE No. 30.

Method.	Number of stations. Canton-ment areas.	British troops' barracks and quarters.	Indian troops' barracks and quarters.
Incineration	64	74	85
Incineration, plus cartage and trenching	18	8	8
Cartage and trenching	27	28	28
Water carriage	3	4	5
Water carriage, plus incineration	..	2	..

Latrines are more or less fly-proofed. In barracks, but seldom in cantonments, the latrine pans contain a solution of cresol.

The incineration system is efficient—except that, for hours at a time, the latrine-incinerator sweepers (especially those on cantonments staffs) go off duty. In the absence of these men, latrine pans are left unattended for long intervals, thus defeating the main objective of incineration—*viz.*, immediate removal and destruction of faecal matter. This is a serious defect in a dysentery-ridden station such as Quetta; and it is doubly serious in one such as Poona, where the carting-trenching method is followed. Than the latter, as practised in such countries as India and Japan, nothing more foul, noisome and dangerous could well be devised by the wit of man: it is only one whit better than the complete absence of a sewage disposal system.

From the above it will be seen that, in garrison stations in India, conservancy is still primitive; and that it will be long ere the water-carriage system comes into general use.

Pathology.

24. Details of much of the work done in the pathology laboratories have been recorded in the section on diseases.

No new laboratories have been constructed owing to financial stringency, but there remain only one District Laboratory and two Brigade Laboratories which require modernization, and it is hoped that this will be accomplished in the fairly near future.

A pannier to carry a microscope and the necessary simple apparatus for the microscopic diagnosis of dysentery and malaria has been devised and successfully subjected to very severe tests as regards its suitability for the rough and tumble of field service conditions. A number of these panniers have been assembled and will be held on charge by certain laboratories for issue to field medical units on manœuvres or mobilization. The necessity for something of the kind has long been recognised and has hitherto been met by improvisation.

Field Operations.

The Mohmand-Bajaur operations.

25. The Deputy Assistant Director of Hygiene with the Peshawar-Nowshera columns submitted an excellent sanitary report which, unfortunately, is too lengthy for insertion here.* This report contains much

*It is hoped that, in due course, this report may be published in the Journal of the Royal Army Medical Corps.

of interest and value, and its recommendations are at present under examination.

At the same time it must be confessed that, although on the North-West Frontier war is always with us: yet it is true that each recurring set of operations teaches something new in the domain of hygiene.

To what extent this teaching is new in fact, or merely in appearance, is left to the medical historian to say; but certain it is that, so far as war sanitation is concerned, the military memory is short and the faculty of profiting from experience is limited. However, in this respect, the Indian war machine is not peculiar.

The first move of the troops took place on 30th July, so that much strenuous work had to be done when heat-humidity conditions were at their worst.

The operations continued up to the end of September. Although wastage on account of malaria did not come up to expectation, still it was very high; and malaria incidence at the conclusion of the business was exceedingly heavy.

Of 50 officers, 16 contracted malaria. Of 222 British other ranks, 93 went down with the disease. And this, despite the administration of "delay action" quinine.

The table which follows makes plain the ravages of malaria during field service on the frontier at this time of the year:—

TABLE No. 31.

Per cent. incidence of malaria: Mohmand-Bajaur Operations (Peshawar and Nowshera Columns).

British officers	38·5
British other ranks	44·0
Indian troops	44·1
Followers	42·0

Since the close of these operations a succession of reports has shown that, up to the end of May, 1934, at any rate, the troops engaged had not fully recovered from the severity of their infections. Amongst them relapse rates are unduly high.

Apart from malaria, and taking into account the trying climatic conditions, the health of the troops was surprisingly good.

SECTION II.

ON THE HEALTH OF THE INDIAN ARMY DURING 1933.

(From the Director, Medical Services in India.)

26. General health statistics of the Indian Army in India during the year 1933 are given in the table below:—

	Average strength.	Admissions. No.	Admissions. Ratio per 1,000.	Deaths. No.	Deaths. Ratio per 1,000.	Invalids sent to United Kingdom. No.	Invalids sent to United Kingdom. Ratio per 1,000.	Invalids discharged in India. No.	Invalids discharged in India. Ratio per 1,000.	Invalids average constantly sick. No.	Invalids average constantly sick. Ratio per 1,000.
Officers	2,133	737	345·5	10	4·69	35	16·41	...	...	24	11·39
Indian Ranks	117,531	60,063	510·9	281	2·39	...	...	668	5·68	2,011	17·11
Followers	27,751	9,238	332·9	123	4·43	...	...	114	4·11	302	10·90
Others*	...	2,051	...	23	...	...	...	77	...	...	...

The health statistics of officers and Indian ranks for the quinquennial periods 1920—24 and 1925—29 with those for 1930, 1931, 1932 and 1933 are given separately in the following table for purposes of comparison.

TABLE B.

Period.	Ratio per 1,000. Admissions. King's Commissioned officers.	Admissions. Indian ranks.	Invalids. King's Commissioned officers.	Invalids. Indian ranks.	Deaths. King's Commissioned officers.	Deaths. Indian ranks.
1920-24	698·3	593·2	3·65	18·25	6·67	8·01
1925-29	498·0	385·6	5·22	10·80	4·74	3·48
1930	313·7	417·9	16·42	6·23	5·47	3·16
1931	367·4	451·3	14·73	8·73	5·52	2·96
1932	321·8	429·8	11·95	6·47	6·90	2·52
1933	**345·5**	**510·9**	**14·41**	**5·68**	**4·69**	**2·39**

OFFICERS.

27. The admission rate of officers sick in hospital for 1933 is 345·5 per 1,000 of strength as compared with 321·8 in 1932.

The principal causes of sickness were:—

TABLE C.

Diseases.	Actuals.	Ratio per 1,000.	Increase or decrease as compared with 1932. Increase.	Decrease.
Malaria	98	45·9	12·8	..
Local Injuries	94	44·1	2·7	..
Minor septic diseases	61	28·6	1·9	..
Tonsillitis	37	17·3	..	1·6
Sandfly fever	37	17·3	7·2	..
Liver diseases	31	14·5	7·1	..
Influenza	29	13·6	..	3·4
Diarrhœa	27	12·7	1·2	..
Dysentery	22	10·3	..	1·9
Diseases of Bones, Joints, Muscles, Fasciae and Bursae	21	9·8	..	3·1
Appendicitis	20	9·4	..	0·7
Ear and Nose	19	8·9	..	3·5
Diseases of urinary organs	19	8·9	0·6	..
Bronchitis	16	7·5	..	2·1

* Includes Reservists, Indian Territorial Force, Royal Indian Marine, Indian States Forces, R. A. F., Civilians and Pensioners.

There were 10 deaths of which 5 were due to Injuries, and 5 to other diseases (Jaundice spirochaetal, myocarditis, Lobar pneumonia, Appendicitis and Nephritis at one each).

SOLDIERS.

28. 60,063 or 510·9 per 1,000 of the strength were admitted to hospital, compared with 429·8 in 1932.

There is thus an increase of 81·1 per 1,000 compared with the 1932 figures.

The principal causes of admissions to hospital were:—

TABLE D.

Diseases.	Actuals.	Ratio per 1,000.	Increase or decrease as compared with 1932. Increase.	Decrease.
Malaria	24,945	212·2	67·1	..
Local Injuries	5,668	48·2	4·5	..
Minor septic diseases	3,846	32·7	2·3	..
Pharyngitis	2,161	18·4	0·3	..
Dysentery	1,804	15·3	..	1·4
Bronchitis	1,551	13·2	..	0·1
Influenza	1,293	11·0	0·7	..
Venereal diseases	1,275	10·8	..	0·1
Sandfly fever	1,227	10·4	..	4·9
Scabies	1,032	8·8	3·8	..
Diarrhœa	933	7·9	1·5	..
Rhinitis	866	7·4	0·1	..
Pneumonia (Lobar and Lobular)	730	6·2	..	1·7
Tonsillitis	707	6·0	..	0·1
Conjunctivitis	682	5·8	..	0·3
Mumps	660	5·6	3·2	..
Indigestion	478	4·1	0·7	..
Constipation	487	4·1	0·8	..
Synovitis	455	3·9	0·3	..
Jaundice	365	3·1	..	0·6
Ankylostomiasis	349	3·0	..	1·6
Dermatitis	347	3·0	0·7	..
Otitis media	311	2·6	0·4	..
Myalgia	286	2·4	0·5	..
Piles	263	2·2	0·1	..
Common Cold	262	2·2	..	..
Enteric group of fevers	244	2·1	..	..
Eczema	249	2·1	..	..
Dengue	244	2·1	0·9	..
Pleurisy	219	1·9	..	..
Dracontiasis	207	1·8	1·2	..
Ring Worm	211	1·8	..	0·3
Pulmonary tuberculosis	203	1·7	..	0·4
Measles	174	1·5	0·7	..
Keratitis ulcerative	159	1·4	0·1	..
Trachoma	158	1·3	..	0·5
Colic	150	1·3	..	..

It will be seen that the increase is almost entirely attributable to malaria. The variations in other conditions, whether increase or decrease, are of minor importance.

The death rate has fallen to 2·39 per 1,000 as compared with 2·52 in 1932, thus showing a decrease of 0·13 per 1,000 on the rate of 1932.

The main causes of deaths were:—

TABLE E.

Diseases.	Actuals.	Ratio per 1,000.	Increase or decrease as compared with 1932. Increase.	Decrease.
Pneumonia (Lobar and Lobular)	89	0·76	..	0·04
Local Injuries	24	0·20	..	0·15
Enteric group of fevers	23	0·20	0·06	..
Meningococcal infection	15	0·13	0·06	..
Circulatory diseases	14	0·12	0·02	..
Pulmonary tuberculosis	13	0·11	..	0·02
General injuries	13	0·11	0·04	..
Nervous diseases	9	0·08	..	..
Digestive diseases	8	0·07	..	0·10
Malaria	7	0·06	..	0·04
Other respiratory diseases	7	0·06	..	0·01
Urinary diseases	6	0·05	0·01	..
Plague	6	0·05	0·01	..
Poisons	5	0·04	0·01	..
Suicides	4	0·03	..	0·03

There is a fall in the invaliding rate of 0·79 per 1,000.

The principal causes of invaliding were:—

TABLE F.

Diseases.	Actuals.	Ratio per 1,000.	Increase or decrease as compared with 1932. Increase.	Decrease.
Pulmonary tuberculosis	187	1·59	..	0·48
Injuries	107	0·91	0·03	..
Diseases of Bones, Joints, Muscles, Fasciæ and Bursæ	54	0·46	0·14	..
Diseases of the eye	43	0·37	..	0·06
Diseases of the nervous system	35	0·30	..	0·12
Mental diseases	34	0·29	0·12	..
Other tubercular diseases	33	0·28	0·07	..
Respiratory diseases (other than Pneumonia and Pulmonary tuberculosis)	30	0·26	..	0·11
Digestive diseases	23	0·20	0·04	..
Circulatory diseases	19	0·16	..	0·10
Diseases of the urinary organs	19	0·16	0·08	..
Diseases of Ear and Nose	16	0·14	..	0·12
Venereal diseases	8	0·07	..	0·05
Malaria	6	0·05	..	0·02
Leprosy	6	0·05	..	0·02
Rheumatic fever	5	0·04	0·02	..

The average number constantly sick in hospital was 2,011·00 or 17·11 per 1,000 of the strength, compared with 15·72 in 1932.

The average sick time to each soldier was 6.24 days, and the average duration of each case 12·22 days; the corresponding figures were 5·75 and 13·38 in 1932.

163,570 men, or 1,391·4 per 1,000 of the strength, were treated as out-patients compared with 1193·8 per 1,000 in 1932. The average daily number under treatment in barrack was 2,271·26 or 19·32 per 1,000 compared with 15·56 per 1,000 in 1932.

The combined ratio constantly sick in hospital and under treatment as out-patients was 36·43 per 1,000 of the strength, compared with 31·28 in 1932.

The above represents a loss of 734,015 men days in capital and 829,010 men days treated in barracks or a total loss of 1,563,025 men days in the year.

TABLE

Table showing admission and death ratios per 1,000 of the strength for all causes and certain

Stations with total admission ratios higher than all-India.

Stations.		Pesha-war.	Bannu.	Now-shera.	Wana.	Fort Sande-man.	Lahore.	Rawal-pindi.	Kohat.	Jhe-lum.	Abbot-tabad.
Strength		5,511	2,032	3,335	2,824	2,132	2,393	4,055	3,785	2,208	3,705
All Causes	A.	795·1	758·9	725·0	703·6	699·3	653·2	638·7	580·2	579·3	561·4
	D.	2·36	0·98	2·10	3·54	1·88	4·60	2·96	2·64	1·81	4·86
	Av. C. S.	24·66	27·16	21·58	21·20	15·61	22·46	21·14	19·01	17·43	16·18
Malaria	A.	475·8	395·2	450·7	366·9	529·5	231·5	358·3	308·9	256·8	330·1
	D.	..	..	..	..	..	0·84	0·25	..	..	..
Sand-fly fever	A.	20·3	64·0	9·0	14·9	30·5	25·9	27·4	10·6	9·1	3·2
	D.	..	..	..	..	..	..	..	..	..	..
Enteric Group	A.	1·7	2·5	2·1	0·7	3·0	6·3	4·2	1·1	2·4	3·1
	D.	..	..	·30	0·35	..	0·84	0·25	0·26	..	0·81
Dysentery	A.	23·4	6·9	18·3	7·8	34·4	18·4	27·9	24·3	11·8	2·9
	D.	0·18	..	..	..	..	..	..	..	..	..
Diarrhœa	A.	10·9	..	11·1	12·0	8·4	7·1	9·6	3·4	10·8	18·1
	D.	..	..	..	..	..	..	..	..	..	..
Influenza	A.	4·9	26·9	..	..	..	85·2	13·8	..	4·1	11·3
	D.	..	..	..	..	..	..	....	..	..	..
Pneumonia Lobar & Lobular.	A.	7·4	5·9	4·8	11·0	4·2	5·0	7·9	7·1	7·7	11·9
	D.	0·73	9·8	0·90	1·42	0·47	0·84	0·99	..	0·91	1·35
Venereal diseases	A.	16·1	11·3	6·6	2·1	2·8	9·6	7·6	3·4	12·2	7·6
	D.	..	..	..	0·35	..	..	..	..	..	..
Minor septic diseases	A.	47·7	42·8	43·5	60·2	7·5	55·6	26·9	30·9	41·2	18·4
	D.	..	..	..	..	..	..	..	..	..	..
Local Injuries	A.	37·7	60·0	64·2	90·3	16·9	57·7	43·2	51·5	58·4	34·0
	D.	0·36	..	0·30	..	0·47	0·42	0·74	1·32	..	..
Heat-stroke	A.	..	..	0·6	..	..	..	..	..	0·9	..
	D.	..	..	0·30	..	..	..	..	..	0·45	..
Heat-exhaustion	A.	1·5	..	0·09	..	..	5·0	..	0·3	..	..
	D.	0·18	..	..	..	..	..	..	..	..	..
Ankylostomiasis	A.	1·6	1·5	2·1	5·0	1·4	4·6	3·7	4·0	3·2	3·5
	D.	..	..	..	..	..	..	..	..	..	..
Pulmonary tuberculosis	A.	3·1	0·5	1·5	0·7	0·5	3·8	2·5	2·6	4·1	1·1
	D.	..	..	..	0·35	..	..	0·25	..	..	0·8

G.

important diseases for stations with a strength of 2,000 and upwards compared with all-India.

Stations with total admission ratios lower than all-India.

Ambala.	Quetta.	Jubbulpore.	All India.	Jhansi.	Sialkot	Razmak.	Ferozepore.	Bangalore.	Meerut.	Poona.	Trumulgherry.
2,311	6,915	2,116	117,561	2,147	2,175	4,786	2,043	2,477	2,521	4,066	2,952
521·9	532·6	514·7	510·9	464·4	460·7	433·1	426·8	416·6	363·7	328·8	318·8
2·16	2·89	1·42	2·39	3·26	0·92	4·18	1·47	2·83	1·98	3·20	1·69
16·64	20·22	14·97	17·11	14·18	18·70	16·75	12·47	20·32	16·05	11·72	14·52
219·0	261·0	91·2	212·2	90·4	121·4	104·7	136·6	17·8	53·9	123·2	31·8
0·43	0·14	...	0·06	...	...	...	...	...	0·40	...	...
...	1·2	4·7	10·4	0·9	7·8	...	28·9	...	0·8	0·2	6·4
...	...	...	...	...	...	...	...	...	...	...	...
2·1	1·7	2·4	2·5	6·1	1·4	...	3·0	1·6	3·6	0·5	4·4
...	0·29	...	0·20	0·47	...	...	0·98	0·40	...	0·25	0·34
11·7	37·0	10·9	15·4	14·4	5·1	20·0	5·9	15·0	17·1	12·3	21·6
...	...	...	0·02	...	...	...	...	...	...	...	...
11·3	4·2	14·7	7·9	9·3	16·1	1·7	9·3	11·7	10·7	4·7	3·4
...	...	...	...	...	...	...	...	...	...	...	...
...	13·3	1·9	11·0	0·5	...	...	32·3	30·3	0·8	4·7	...
...	...	...	...	...	...	...	...	...	...	...	...
3·0	6·8	1·4	6·2	4·7	5·5	11·3	7·8	5·7	4·4	3·4	1·7
...	1·88	...	0·76	0·47	...	2·30	...	0·40	...	0·49	...
6·1	6·2	5·7	10·8	12·6	1·8	2·7	6·9	28·7	11·5	19·9	10·2
...	...	...	0·01	...	...	...	...	...	...	...	...
41·5	25·7	73·3	32·7	34·5	46·9	29·3	39·2	43·2	25·4	19·2	26·1
...	...	...	...	...	...	0·21	...	...	...	...	...
60·1	42·4	53·9	48·2	88·0	76·8	53·5	25·9	63·8	61·5	27·1	51·2
...	...	...	0·20	1·86	0·92	0·21	...	...	...	...	...
...	...	...	0·03	...	...	...	...	...	...	...	...
...	...	...	0·02	...	...	...	...	...	...	...	...
...	...	...	0·4	...	...	...	...	...	...	0·2	1·0
...	...	...	0·03	...	...	...	...	...	...	0·25	...
1·3	9·3	1·4	3·0	3·3	0·9	4·8	2·0	0·4	1·3	0·5	8·1
...	...	...	...	...	...	...	...	...	...	...	...
1·3	1·7	1·4	1·7	0·9	1·8	1·3	2·0	0·4	2·4	0·05	3·0
0·43	0·14	...	0·11	...	...	0·63	...	...	...	...	...

Dengue.

29. 244 cases are included under this heading giving a ratio of 2·1 per 1,000 compared with 1·2 in 1932. The stations principally affected were:—

	Actuals.	Ratio per 1,000.		Actuals.	Ratio per 1,000.
Mingaladon . .	78	99·4	Madras . . .	30	60·0
Bangalore . .	47	19·0	Mandalay . . .	27	30·8
Benares . . .	37	50·1	Alipore . . .	17	10·5

Dysentery, Diarrhœa and Colitis.

30. Admission and death ratios for Dysentery, Diarrhœa and Colitis for the years 1913 and 1924 to 1933 are given in table H.

Table H.

Years.	Dysentery.		Diarrhœa.		Colitis.		Combined.	
	A.	D.	A.	D.	A.	D.	A.	D.
1913 . .	11·7	0·09	13·7	0·01	4·5	..	29·9	0·10
1924 . .	6·5	0·04	12·2	..	11·2	..	30 0	0·04
1925 . .	6·5	0·03	13·8	..	5·5	..	23·8	0·03
1926 . .	10·6	0·02	14·0	..	0·3	..	24·8	0·02
1927 . .	11·6	0·08	10·8	..	0·2	..	22·6	0·08
1928 . .	12·1	0·05	11·4	0·01	0·3	0·1	23·8	0 06
1929 . .	14·4	0·05	10·2	..	0·4	..	25·0	0·05
1930 . .	19·7	0·09	8·0	..	0·3	..	27·9	0·09
1931 . .	16·7	0·03	7·6	..	0·2	..	24·6	0·03
1932 . .	16·7	0·02	6·4	..	0·2	..	23·3	0·02
1933 . .	**15·3**	**0·02**	**7·9**	..	**0 3**	..	**23·5**	**0·02**

There were 2,767 admissions for this group of diseases a decrease of 47 cases.

The admissions for various types of dysentery during the past 7 years are shown below. As for British troops, the cases with Bacillary exudates have been included in the Bacillary Group.

	1927.	1928.	1929.	1930.	1931.	1932.	1933.
Amoebic Dysentery .	205	77	116	213	124	251	**96**
Bacillary Dysentery .	346	481	810	1,628	1,435	1,371	**1,297**
Clinical Dysentery .	992	1,032	935	680	512	398	**411**

The percentage of the different types of dysentery in 1933 were:—

Dysentery amoebic	5·32
Dysentery bacillary	71·90
Dysentery clinical	22·78

The majority of the cases of dysentery were mild, and in all only 2 deaths occurred in 1,804 cases, the percentage death rate of admissions being therefore 0·11 per cent.

The distribution of the various forms of dysentery by commands is shown below in ratios per 1,000 of strength:—

Table I.

	Dysentery.			
	Amoebic.	Bacillary. (bacteriologically proven).	Bacillary exudate.	Clinical.
Northern Command	0·4	6·0	4·5	4·1
Western Command	1·7	11·0	7·9	6·4
Eastern Command	1·4	4·4	3·8	1·9
Southern Command	0·7	6·1	5·5	2·0
Burma District	1.0	4 3	1·3	3·0

Enteric Group of Fevers.

31. There were 12 less cases than in 1932, giving the same ratio of 2·1 admissions per 1,000 of strength, as in 1932.

There were 23 deaths among the 244 admissions or 9·43 per cent. and a death rate of 0·20 per 1,000 strength as compared with 0·14 in 1932.

Other points of interest regarding these fevers have been discussed at length in the section of the report dealing with British troops, wherein many cases figures for British and Indian troops are combined.

The inoculation state of the troops is good. In September when the last return was rendered, the figures were as follows:—

Table J.

	British officers attached to Indian Units.	Indian ranks.	Followers.
Strength	2,095	122,219	27,115
Number protected	1,894	121,152	26,764
Number unprotected	201	1,067	351
Percentage protected	90·41	99·13	98·71

The relative incidence and deaths among protected and unprotected cases of Indian Ranks are shown below. The figures representing protected and unprotected are obtained by making an average of the two half-yearly returns and represent therefore an approximate and not an actual figure. The figures regarding incidence and death are taken from special report forms rendered regarding enteric fever.

Table K.

	Strength.	Actuals.		Ratio per 1,000.		Case Mortality per cent.
		Cases.	Deaths.	Cases.	Deaths.	
Protected	117.730	215	19	1·8	0·16	8·84
Unprotected	1,843	31	4	16·8	2·17	12·90

Malaria.

32. The admissions for all forms of malaria totalled 24,945 with 7 deaths and 6 invalids. The ratio per 1,000 of strength contrasted with 1929, 1930, 1931 and 1932 were:—

	1929.	1930.	931.	1932.	1933.
Admissions . .	175·3	153·4	149·4	145·1	212·2
Deaths . . .	0·15	0·13	0·10	0·10	0·06
Invalids. . .	0·21	0·06	0·08	·07	0·05

Various problems relating to malaria and anti-malarial measures are discussed in detail in the section referring to British troops.

The following table shows the incidence of the various types of the disease by Commands.

TABLE L.

Commands & Independent Districts.		Admissions and Deaths. Actuals. B. T.	M. T.	Qtn.	Clin.	Ratio per 1,000. B. T.	M. T.	Qtn.	Clin.
Northern	A.	8,944	4,476	6	2,268	159·5	79·8	0·1	40·4
	D.	2	1	..	1	0·04	0·02	..	0·02
Western .	A.	1,884	1,695	2	105	142·6	128·3	0·2	7·9
	D.	..	1	..	..	..	0·08	..	..
Eastern .	A.	1,684	753	12	458	70·7	31·6	0·5	19·2
	D.	..	1	..	..	..	0·04	..	..
Southern.	A.	1,279	719	9	124	59·7	33·5	0·4	5·8
	D.	..	1	..	..	..	0·05	..	..
Burma .	A.	150	64	3	75	50·0	21·3	1·0	25·0
	D.	..	..	..	..	..	..	..	..
All India	A.	13,941	7,707	32	3,030	118·6	65·6	0·3	25·8
	D.	2	4	..	1	0·02	0·03	..	0·01

The stations with an average annual strength of over 1,000 showing the highest incidence were:—

Fort Sandeman . .	529·5	Delhi . . .	277·1
Peshawar . . .	475·8	Quetta . . .	261·0
Nowshera . . .	450·7	Jhelum . . .	256·8
Bannu	395·2	Mir Ali . . .	240·0
Wana	366·9	Lahore . . .	231·5
Rawalpindi . . .	358·3	Ambala . . .	219·0
Abbottabad . . .	330·1	Karachi . . .	210·1
Kohat	308·9	Bakloh . . .	205·9

The stations with an average annual strength of over 500 and under 1,000 showing the highest incidence were:—

Neemuch . . .	605·5	Multan . . .	250·8
Mardan . . .	566·7	Baroda . . .	230·6
Malakand . . .	454·5	Bankura . . .	224·9
Loralai	375·2	Dharamsala . .	224·4
Thal	338·9	Aurangabad . .	215·1
Muttra	294·9	Saidpur . . .	214·8
Comilla . . .	284·3		

The incidence of malaria was adversely affected by the Mohmand-Bajaur Operations. The troops (nearly all of whom were Indian) engaged were severely and heavily infected in the field, and the result of this continued to show itself long after the operations ceased. Further, it is expected that this extensive infection will produce an adverse "carry-over" effect on the malaria statistics for 1934.

Pneumonia.

TABLE M.

Years.	Admissions. Actuals.	Admissions. Ratio per 1,000.	Deaths. Actuals.	Deaths. Ratio per 1,000.	Years.	Admissions. Actuals.	Admissions. Ratio per 1,000.	Deaths. Actuals.	Deaths. Ratio per 1,000.
1920	3,772	17·4	833	3·85	1927	1,367	10·3	190	1·43
1921	2,796	15·9	644	3·67	1928	1,097	8·4	147	1·12
1922	2,077	14·0	412	2·79	1929	1,167	9·1	181	1·40
1923	1,972	13·8	343	2·39	1930	1,147	9·0	159	1·24
1924	2,066	15·3	381	2·83	1931	1,078	8·7	132	1·06
1925	1,722	12·6	267	1·96	1932	961	7·9	97	0·80
1926	1,508	11·2	230	1·70	1933	730	6·2	89	0·76

Of the 730 cases admitted 623 were lobar and 107 lobular in type. The case mortality of the two types were 11.40 and 16.82 per cent respectively.

The incidence by Commands was:—

	Ratio per 1,000.
Northern Command	7·7
Western "	5·7
Eastern "	5·1
Southern "	3·5
Burma District	8·7

Pyrexia of uncertain origin.

34. 12 cases were included under this head giving a ratio of 0·1 per 1,000 compared with 0·2 in 1932.

Sandfly Fever.

35. The admissions for this disease decreased from 1,850 to 1,227 giving a ratio per 1,000 of strength of 10·4 compared with 15·3 in 1932. The incidence fell chiefly on the troops in Peshawar District, Kohat District and Zhob Independent Brigade Area with ratios per 1,000 of 21·9, 11·7 and 25·8 respectively.

Small-pox.

36. There were 43 admissions with 3 deaths giving a ratio of 0·4 and 0·03 per 1,000. 99·63 per cent. of the troops were protected by vaccination within 5 years.

Tuberculosis.

37. Pulmonary tuberculosis caused 203 admissions with 13 deaths and 187 invalids giving ratios per 1,000 of 1.7, 0.11 and 1.6 respectively.

There were 50 admissions for tuberculosis of other organs with 3 deaths and 33 invalids giving ratios per 1,000 of 0.4, 0.03 and 0.28 respectively.

Venereal Diseases.

38. This group accounted for 1,275 admissions. The ratio per 1,000 fell from 10·9 in 1932 to 10·8 in 1933.

TABLE N.

Diseases.	Admissions.		Percentage.	
	1932.	1933.	Increase.	Decrease.
Gonorrhœa	642	557	..	13·24%
Syphilis	444	455	2·48%	..
Soft chancre	228	257	12·72%	..

Other Diseases due to Infection.

39. There were 4,564 admissions under this heading. The diseases mainly responsible were:—

Influenza	1,293	Ascariasis	57
Scabies	1,032	Oriental sore	53
Mumps	660	Relapsing fever	44
Ankylostomiasis	349	Cerebro-spinal fever	26
Common Cold	262	Typhus fever	19
Dracontiasis	207	Diptheria	14
Measles	174	Kala azar	11
Chicken Pox	121	Plague	7
Rheumatic fever	99	Leprosy	6
Intestinal taeniasis	58		

Diseases of the Circulatory System.

40. Circulatory diseases caused 99 admissions to hospital, giving a ration of 0.8 per 1,000, compared with 0.8 in 1932, 1.2 in 1931, 1.3 in 1930 and 1929, 1.6 in 1928, 1.3 in 1927, 1.3 in 1926, 1.7 in 1925 and 1·0 in 1913.

There were 14 deaths from this group of diseases giving a ratio per 1,000 of 0.12 compared with 0.10 in 1932, 0.09 in 1931, 0.15 in 1930, 0.11 in 1929, 0.10 in 1928, 0.12 in 1927, 0.15 in 1926, 0.09 in 1925 and 0.11 in 1924.

The important diseases in this group were:—

Disordered action of the heart	34
Diseases of the heart valves	17
Varix	10
Inflammation of veins	11

Diseases of Respiratory System.

41. The admissions for diseases of the respiratory system totalled 2,011 exclusive of pneumonia and tuberculosis (934), a ratio of 17.1 per 1,000 Of these 1,551 were due to bronchitis giving ratio per 1,000 of 13.2 compared with 13.3 for 1932. There were 7 deaths and 30 cases were invalided.

The other important diseases in the group were pleurisy 219, laryngitis 94 and asthma 109.

Diseases of the Digestive System.

42. There were 6,252 admissions for the diseases of the digestive system with 8 deaths and 23 invalids, the ratios per 1,000 were admissions 53.2, deaths 0.07 and invalids, 0.20 respectively.

The most important individual diseases were:—

TABLE O.

	Admissions.	Deaths.	Invalids.
Pharyngitis	2,161	..	..
Diarrhœa	933	..	..
Tonsillitis	707	..	..
Constipation	487	..	1
Indigestion	478	..	1
Jaundice	365	..	..
Hæmorrhoids	263	..	..
Colic	150	..	..
Appendicitis	132	1	2
Gastritis	111	..	..
Hepatitis	72	..	2

In addition to the above there were 67 cases of hernia with 5 invalids. Tuberculosis of various abdominal organs produced 12 admissions.

Minor Septic Diseases.

43. This group produced 3,846 admissions giving a ratio of 32.7 per 1,000 of strength. Included in the group were:—

Cellulitis	2,475
Boils	644
Abscess	445
Inflammation of lymphatic glands and vessels	176

Local Injuries.

44. There were 5,668 admissions in this group. The ratio per 1,000 is 48.2 compared with 43.7—1932.

Followers.

45. The total admissions were 9,238 or 332.9 per 1,000 of the strength compared with 266.4 in 1932.

The table below gives figures for certain endemic and infectious diseases amongst followers:—

TABLE P.

	Admissions.			Admissions.	
	Actuals.	Ratio per 1,000.		Actuals.	Ratio per 1,000.
Malaria . .	3,972	143·1	Diarrhœa . .	151	5·4
Veneral diseases*	309	11·1	Scabies . .	118	4·3
Pneumonia .	242	8·7	Pulmonary tuberculosis.	45	1·6
Dysentery .	211	7·6	Enteric group of fevers.	36	1·3
Influenza . .	192	6·9	Dengue . .	16	0·6
Sandfly fever .	171	6·2	Small-pox . .	10	0·4

There were 123 deaths with a ratio of 4.43.

The principal causes were:—

TABLE Q.

	Actuals.	Ratio per 1,000.		Actuals.	Ratio per 1,000.
Pneumonia . . .	41	1·48	Pulmonary tuberculosis	6	0·22
Injuries . . .	13	0·47	Poisoning . . .	4	0·14
Other respiratory diseases	12	0·43	Enterica .	3	0·11
Other infectious diseases	9	0·32	Anæmia secondary .	2	0·07
Circulatory diseases .	9	0·32	Nephritis . . .	2	0·07
Digestive diseases . .	8	0·29	Dysentery . . .	2	0·07
Malaria	6	0·22	Small-pox . . .	1	0·04

Recruiting.

46. The total number of recruits examined at recruiting centres in the year ending 31st March 1934 was 19,704. Of these, 6,978 were rejected, giving a percentage of 35.41. The corresponding figure for the year 1932-33 was 44.91 per cent.

*Gonorrhœa 149 Syphilis 102 and Soft chancre 58.

The principal causes of rejection of recruits for the year ending 31st March 1934 were as follows:—

TABLE R.

Disability.	No. of men rejected as unfit for enrolment out of 1,907 presented at recruiting centres only.		No. of recruits found unfit during training out of 17,675 enrolled (13,047 recruits enrolled at recruiting centres and 4,628 at unit headquarters).	
	Actuals.	Percentage.	Actuals.	Percentage.
Malaria (enlarged spleen)	986	5·00	3	0·02
Tuberculosis (Pulmonary)	41	0·21	12	0·06
Tuberculosis (Other organs)	18	0·09	9	0·05
Venereal disease	121	0·61	2	0·01
Other diseases due to infection	9	0·05	4	0·02
Diseases of the nervous system	18	0·09	13	0·07
Defective vision	217	1·10	4	0·02
Trachoma	692	3·51	1	0·01
Other eye affections	135	0·69	6	0·03
Otitis media	311	1·58	3	0·02
Defective hearing	16	0·08	..	..
Other ear diseases	105	0·53	2	0·01
Diseases of nose and throat	229	1·16	..	..
Valvular disease of heart	113	0·57	3	0·02
Disordered action of heart	576	2·92	4	0·02
Varicose veins	133	0·67	1	0·01
Haemorrhoids	115	0·58	..	..
Varicocele	77	0·39	..	..
Other diseases of circulatory system	20	0·10	2	0·01
Anaemia	242	1·23	1	0·01
Goitre	191	0·97	..	..
Respiratory diseases excluding tuberculosis	36	0·18	5	0·03
Pyorrhœa	305	1·55	..	..
Loss or decay of teeth	43	0·22	..	..
Hernia	192	0·97	1	0·01
Other diseases of digestive system	24	0·12	1	0·01
Ankylosis of joint	54	0·27	3	0·02
Flat foot	88	0·45	1	0·01
Knock knee	90	0·46	1	0·01
Curvature of spine	191	0·97	2	0·01
Other deformities	253	1·28	1	0·01
Skin diseases	262	1·33	1	0·01
Poor physique	215	1·09	3	0·02
Other causes	860	4·36	49	0·28
Total	6,978	·3541	138	0·7

The reader who has perused the preceding section relating to British troops will have recognised that much of the subject-matter in the latter is equally applicable to the Indian troops.

APPENDICES.

SECTION I.

BRITISH TROOPS, 1933.

TABLE A.

STATIONS BY COMMANDS AND INDEPENDENT DISTRICTS.

Stations.	Height above M.S. level in feet.	Authority for height.	Points of reference.
Northern Command.			
Abbottabad	4,010	S.D.	Map.
Ambala	902	,,	S.B.M.
Amritsar	754	,,	,,
Bannu	1,250	,,	Map.
Barian Camp and Khyragali	7,133 / 7,678	I.B. / S.D.	.. / Map.
Campbellpore	1,180	,,	,,
Cherat	4,546	,,	,,
Dagshai	6,087	,,	,,
Dalhousie Convalescent Depot	7,687	,,	..
Dera Ismail Khan	568	,,	S.B.M.
Ferozepore	649	,,	,,
Gharial	6,811	S.G.	,,
Jhelum	762	S.D.	,,
Jullundur Cantt.	771	,,	B.M.
Jutogh	6,370	,,	Map.
Kalabagh & Baragali	7,963	,,	,,
Kalabagh & Mari Indus	682	,,	,,
Kasauli Convalescent Depot	6,050	,,	..
Kohat	1,725	,,	Map.
Khanspur and Ghora Dhaka	7,721	,,	,,
Kuldana	7,049	S.G.	,,
Lahore Cantt. and Fort	706	S.D.	S.B.M.
Landikotal	3,509	,,	Map.
Manzai	1,650	,,	,,
Mir Ali	..	..	..
Multan	404	S.D.	S.B.M.
Murree Convalescent Depot	7,073	,,	Map.
Nowshera (Rly. Station)	966	,,	B.M.
Peshawar	1,152	,,	S.B.M.
Rawalpindi	1,689	,,	,,
Razmak	6,556	,,	Map.
Risalpur	1,014	,,	B.M.
Sialkot	829	,,	,,
Solon	5,078	,,	,,
Sabathu	4,000	S.D.	Map.
Thal	2,450	,,	,,
Upper Topa	7,000	M.O.	,,
Wana	..	..	..
Western Command.			
Hyderabad	96	S.D.	S.B.M.
Karachi (Holy Trinity Church)	28	,,	,,
Loralai	4,699	,,	Map.
Quetta	5,510	..	S.B.M.
Eastern Command.			
Agra (Fort)	525	S.D.	S.B.M.
Allahabad & Fort	314	,,	,,
Bareilly	563	,,	,,
Barrackpore	24	,,	,,
Benares	256	,,	,,
Cawnpore	407	,,	B.M.
Chakrata	6,885	,,	Map.
Dacca	20	M.D.	..
Dehra Dun	2,232	S.D.	S.B.M.
Delhi	757	S.D.	S.B.M.
Dinapore	170	,,	Church.
Fort William	17	S.G.	..
Fyzabad	330	S.D.	S.B.M.
Jhansi	849	,,	,,
Landour Convalescent Depot	7,528	G.T.S.	..
Lebong	6,000	S.D.	..
Lucknow Kalubir's	383	,,	B.M.
Meerut	737	,,	S.B.M.
Muttra	560	,,	,,
Ranikhet and Chaubattia	5,980 / 6,942	,, / S.G.	.. / ..
Roorkee	879	S.D.	S.B.M.
Southern Command.			
Ahmedabad	162	S.D.	S.B.M.
Ahmednagar	2,180	,,	Map.
Bangalore	3,002	,,	S.B.M.
Belgaum	2,523	,,	,,
Colaba (Bombay Town Hall)	20	,,	,,
Deolali	1,894	,,	,,
Jubbulpore	1,320	,,	,,
Kamptee (Rly. Station)	940	,,	B.M.
Madras (Obsy.)	250	G.T.	,,
Malapuram (Rly. Station)	1,380	,,	,,
Mhow (Rly. Station)	1,887	S.D.	,,
Mount Abu Sanatorium	3,836	,,	B.M.
Nasirabad	1,461	,,	,,
Pachmarhi	3,490	,,	,,
Poona	1,867	,,	S.B.M.
Purandhar	4,560	,,	..
Saugor	1,755	,,	S.B.M.
Secunderabad	1,776	,,	,,
Wellington (Stn. Hospital)	5,800	,,	Map.
Burma Ind. District.			
Mandalay (Fort Dufferin).	246	,,	Map.
Maymyo	3,508	,,	,,
Mingaladon	118	,,	,,
Port Blair (Tindal Obsy.)	9	,,	B.M.

S.D. = Survey Department.
S.B.M. = Standard Bench Mark.
B.M. = G. T. Bench Mark.
S.G. = Surveyor-General of India.
M.D. = Meteorological Department.

Map. = Heights taken from Topo. Maps.
M.O. = Medical Officer in charge of military hospital in their sanitary reports.
I.B. = Intelligence Branch of the Division of the Chief of the Staff.

TABLE I.

WARRANT OFFICERS, N. C. Os. AND MEN.

INDIA.

Table showing the Average Strength, Admissions into Hospital, Deaths, Number Invalided and Constantly Sick, during the year 1933, with Ratios per 1,000 of the Strength.

Diseases. Average strength 54,996.	Admissions.	Deaths.	Invalids sent home.	Average number constantly sick.	Ratio per 1,000. Admissions.	Deaths.	Invalids sent home.	Constantly sick.
SPECIFIC DISEASES DUE TO INFECTION OR INFESTATION.								
Cholera	..	..	..	..	..	..	..	..
Dengue	644	..	..	14·28	11·7	..	..	0·26
Diphtheria	69	2	..	6·86	1·3	0·04	..	0·12
Dysentery — bacillary	515	1	3	25·19	9·4	0·02	0·05	0·46
Dysentery — exudate	362	..	1	16·14	6·6	..	0·02	0·29
Dysentery — amœbic	169	..	1	12·85	3·1	..	0·02	0·23
Dysentery — clinical	323	..	2	14·90	5·9	..	0·04	0·27
Enteric fevers*	173	14	..	25·95	3·1	0·25	..	0·47
Erysipelas	13	..	..	0·73	0·2	..	..	0·01
Influenza	1,144	3	..	30·29	20·8	0·05	..	0·55
Malaria	5,681	3	2	165·19	103·3	0·05	0·04	3·00
Measles	9	..	..	0·50	0·2	..	..	0·01
Meningococcal infection (Cerebro-spinal fever)	3	2	2	0·66	0·1	0·04	0·04	0·01

*Inclusive of typhoid, para A, B and C and enteric group.

TABLE I—*contd.*

Diseases.	Admissions.	Deaths.	Invalids sent home.	Average number constantly sick.	Ratio per 1,000. Admissions.	Deaths.	Invalids sent home.	Constantly sick.
Average strength 54,996.								
SPECIFIC DISEASES DUE TO INFECTION OR INFESTATION—*contd.*								
Mumps	13	..	..	0·54	0·2	..	..	0·01
Plague	..	..	..	..	..	..	..	..
Pneumonia	198	15	7	21·48	3·6	0·27	0·13	0·39
Pyrexia of uncertain origin	61	..	..	3·64	1·1	..	..	0·07
Rheumatic fever	68	..	2	8·12	1·2	..	0·04	0·15
Sandfly fever	2,252	..	..	45·47	40·9	..	..	0·83
Scarlet fever	6	..	..	0·71	0·1	..	..	0·01
Small-pox	11	..	..	1·34	0·2	..	..	0·02
Scabies	80	..	..	2·94	1·5	..	..	0·05
Tuberculosis — Pulmonary	46	2	49	14·63	0·8	0·04	0·89	0·27
Tuberculosis — Other	9	1	12	2·32	0·2	0·02	0·22	0·04
Venereal diseases — Gonorrhœa	1,276	..	1	162·45	23·2	..	0·02	2·95
Venereal diseases — Soft chancre	275	..	..	28·97	5·0	..	..	0·53
Venereal diseases — Syphilis	267	..	1	21·65	4·9	..	0·02	0·39
Venereal diseases — Other V. D.	17	..	..	0·82	0·3	..	..	0·01
Typhus fever	23	..	..	2·19	0·4	..	..	0·04
Other diseases due to infection or infestation.	378	5	3	11·61	6·9	0·09	0·05	0·21
OTHER DISEASES CLASSIFIED UNDER SYSTEMS.								
Diseases of the nervous system	389	5	43	21·21	7·1	0·09	0·78	0·39
Mental diseases	195	1	92	34·09	3·5	0·02	1·67	0·62
Diseases of the eye	201	..	16	12·40	3·7	..	0·29	0·23
Diseases of the ear and nose	967	3	32	33·05	17·6	0·05	0·58	0·60

Diseases of the Circulatory system.	Valvular diseases of the heart.	33	..	16	3·17	0·6	..	0·29	0·06
	Disordered action of the heart	162	4	11	9·54	2·9	0·07	0·20	0·17
	Other diseases	77	2	6	5·67	1·4	0·04	0·11	0·10
Diseases associated with abnormalities of the blood		28	3	1	1·75	0·5	0·05	0·02	0·03
Diseases of the spleen		6	..	..	0·26	0·1	..	..	0·00
Diseases of the lymphatic system		245	..	1	14·13	4·5	..	0·02	0·26
Diseases of Ductless or endorcrine glands		22	..	9	8·22	0·4	..	0·16	0·05
Diseases of the breast		10	..	..	0·41	0·2	..	..	0·01
Diseases of the Respiratory system.	Larynx and trachea	88	..	1	2·88	1·6	..	0·02	0·05
	Bronchi and bronchioles	785	..	13	28·64	14·3	..	0·24	0·52
	Lung, other than tuberculosis and pneumonia	14	1	8	1·71	0·3	0·02	0·15	0·03
	Other diseases	113	..	..	8·34	2·1	..	..	0·15
Diseases of the teeth and gums		135	..	..	3·42	2·5	..	..	0·06
Diseases of the Digestive system.	Inflammation of tonsils	1,777	1	..	43·26	32·3	0·02	..	0·79
	Liver diseases	454	2	3	27·37	8·3	0·04	0·05	0·50
	Other diseases	3,439	6	23	128·63	62·5	0·11	0·42	2·34
Diseases due to disorders of nutrition or of metabolism		10	..	2	0·75	0·2	..	0·04	0·01
Diseases of the generative system		640	..	1	29·26	11·6	..	0·02	0·53
Diseases of Bones, Joints, Muscles, Fasciæ and Bursæ		1,274	2	69	67·26	23·2	0·04	1·25	1·22
Diseases of the areolar tissue		2,929	..	4	103·92	53·3	..	0·07	1·89
Diseases of the skin		1,418	..	10	67·62	25·8	..	0·18	1·23
Diseases of the urinary organs		248	4	12	16·81	4·5	0·07	0·22	0·31
Injuries	General	131	20	3	4·06	2·4	0·36	0·05	0·07
	Local	3,313	29	37	147·49	60·2	0·53	0·67	2·68
	In action	..	..	..	..	..	..	..	..
Tumours and cysts		118	1	5	5·70	2·1	0·02	0·09	0·10
Malformations		10	..	..	0·84	0·2	..	..	0·02
Poisons		9	2	..	0·29	0·2	0·04	..	0·01
Parasites		..	..	..	..	..	..	..	..
No appreciable diseases.		† 203	..	2	7·52	3·7	..	0·04	0·14
*Suicides		(15)	(16)	..	(1·23)	(0·3)	(0·29)	..	(0·02)
Total		33,528	134	506	1,476·69	609·6	2·44	9·20	26·85

* The figures against "Suicides" having already been shown under the heading of the injury, etc., which caused death, are not included in the total

† Includes figures for carriers.

TABLE II.

WARRANT OFFICERS, N. C. Os. AND MEN—*contd.*

NORTHERN COMMAND.

Table showing the average strength, admissions into hospital, deaths and constantly sick during the year 1933 with ratios per 1,000 of the strength.

Diseases.	Admissions.	Deaths.	Average number constantly sick.	Ratio per 1,000. Admissions.	Deaths.	Constantly sick.
Average strength 17,449.						
SPECIFIC DISEASES DUE TO INFECTION OR INFESTATION.						
Cholera	..	..	..	..	..	..
Dengue	6	..	0·19	0·3	..	0·01
Diphtheria	23	..	2·57	1·3	..	0·14
Dysentery bacillary	101	..	6·04	5·7	..	0·34
Dysentery exudate	115	..	5·63	6·5	..	0·32
Dysentery amœbic	40	..	3·24	2·3	..	0·18
Dysentery clinical	120	..	5·19	6·8	..	0·29
Enteric fever (inclusive of typhoid, para A, B and enteric group)	63	4	9·69	3·5	0·23	0·55
Erysipelas	5	..	0·30	0·3	..	0·02
Influenza	307	..	8·34	17·3	..	0·47
Malaria	2,836	1	76·09	159·8	0·06	4·29
Measles	1	..	0·05	0·1	..	0·00
Meningococcal infection (cerebro-spinal fever)	..	..	..	..	..	..
Mumps	3	..	0·10	0·2	..	0·01
Plague	..	..	..	..	..	..
Pneumonia	71	4	8·49	4·0	0·23	0·48

Pyrexia of uncertain origin	16	..	1·47	0·9	..	0·08
Rheumatic fever	30	..	3·68	1·7	..	0·21
Sandfly fever	1,525	..	29·00	85·9	..	1·63
Scarlet fever	1	..	0·24	0·1	..	0·01
Small-pox	4	..	0·59	0·2	..	0·03
Scabies	13	..	0·44	0·7	..	0·02
Tuberculosis — Pulmonary	17	1	5·10	1·0	0·06	0·29
Tuberculosis — Other	2	..	0·84	0·1	..	0·05
Venereal diseases — Gonorrhœa	349	..	45·35	19·7	..	2·56
Venereal diseases — Soft chancre	52	..	4·17	2·9	..	0·23
Venereal diseases — Syphilis	70	..	4·90	3·9	..	0·28
Venereal diseases — Other V. D.	12	..	0·54	0·7	..	0·03
Typhus fever	7	..	0·56	0·4	..	0·03
Other diseases due to infection or infestation	184	4	5·09	10·4	0·23	0·29

OTHER DISEASES CLASSIFIED UNDER SYSTEMS.

Diseases of the nervous system	141	2	4·60	7·9	0·11	0·26
Mental diseases	52	..	8·91	2·9	..	0·50
Diseases of the eye	78	..	5·96	4·4	..	0·34
Diseases of the ear and nose	306	..	10·98	17·2	..	0·62
Diseases of the Circulatory system. — Valvular diseases of the heart	14	..	1·85	0·8	..	0·10
Diseases of the Circulatory system. — Disordered action of the heart	52	2	2·45	2·9	0·11	0·14
Diseases of the Circulatory system. — Other diseases	29	1	2·35	1·6	0·06	0·13
Diseases associated with abnormalities of the blood	6	1	0·45	0·3	0·06	0·03
Diseases of the spleen	4	..	0·16	0·2	..	0·01
Diseases of the lymphatic system	62	..	2·70	3·5	..	0·15
Diseases of Ductless or endocrine glands	10	..	0·97	0·6	..	0·05
Diseases of the breast	7	..	0·25	0·4	..	0·01
Diseases of the Respiratory system. — Larynx and trachea	21	..	0·55	1·2	..	0·03
Diseases of the Respiratory system. — Bronchi and bronchioles	227	..	7·12	12·8	..	0·40
Diseases of the Respiratory system. — Lung, other than tuberculosis and pneumonia	6	1	0·84	0·3	0·06	0·05
Diseases of the Respiratory system. — Other diseases	46	..	2·87	2·6	..	0·16
Diseases of the teeth and gums	39	..	0·87	2·2	..	0·05

TABLE II—*contd.*

Diseases.	Admissions.	Deaths.	Average number constantly sick.	Ratio per 1,000. Admissions.	Deaths.	Constantly sick.
Average strength 17,449.						
Diseases of the Digestive system. — Inflammation of tonsils	629	1	14·74	35·4	0·06	0·83
Liver diseases	178	..	9·90	10·0.	..	0·56
Other diseases	1,253	1	43·38	70·6	0·06	2·44
Diseases due to disorders of nutrition or of metabolism	1	..	0·03	0·1	..	0·00
Diseases of the generative system	196	..	8·85	11·0	..	0·50
Diseases of Bones, Joints, Muscles, Fasciæ and Bursæ	431	2	19·95	24·3	0·11	1·12
Diseases of the areolar tissue	1,069	..	36·14	60·2	..	2·04
Diseases of the skin	406	..	19·47	22·9	..	1·10
Diseases of the urinary organs	85	2	6·06	4·8	0·11	0·34
Injuries — General	93	4	3·17	5·2	0·23	0·18
Local	1,152	9	49·10	64·9	0·51	2·77
In action	..	..	..	..	..	..
Tumours and cysts	53	..	2·17	3·0	..	0·12
Malformations	1	..	0·03	0·1	..	0·00
Poisons	1	1	0·01	0·1	0·06	0·00
Parasites	..	..	..	..	..	..
No appreciable disease	†74	..	3·13	4·2	..	0·18
*Suicides	(4)	(3)	(0·38)	(0·2)	(0·17)	(0·02)
Total	12,695	41	497·90	715·3	2·31	28·05

* The figures against "Suicides" having already been shown under the heading of the injury, etc., which caused death, are not included in the total.

† Includes figures for carriers.

TABLE III.

WARRANT OFFICERS, N. C. Os. AND MEN—*contd.*

WESTERN COMMAND.

Table showing the Average Strength, Admissions into Hospital, Deaths and Constantly Sick, during the year 1933, with Ratios per 1,000 of the Strength.

Diseases. Average strength 4,133.	Admissions.	Deaths.	Average number constantly sick.	Ratio per 1,000. Admissions.	Deaths.	Constantly sick.
SPECIFIC DISEASES DUE TO INFECTION OR INFESTATION.						
Cholera	..	..	..	..	..	..
Dengue	15	..	0·40	3·6	..	0·10
Diphtheria	1	..	0·05	0·2	..	0·01
Dysentery bacillary	98	..	4·21	23·7	..	1·02
,, exudate	33	..	1·14	8·0	..	0·28
,, amœbic	9	..	0·76	2·2	..	0·18
,, clinical	27	..	0·98	6·5	..	0·24
Enteric fever (inclusive of typhoid, para A, B and enteric group)	8	..	1·46	1·9	..	0·35
Erysipelas	1	..	0·02	0·2	..	0·00
Influenza	171	..	5·30	41·4	..	1·28
Malaria	843	..	21·83	204·0	..	5·28
Measles	2	..	0·09	0·5	..	0·02
Meningococcal infection (cerebro-spinal fever)	..	..	..	..	..	..
Mumps	1	..	0·05	0·2	..	0·01
Plague	..	..	..	..	..	..
Pneumonia	11	2	1·12	2·7	0·48	0·27

TABLE III—*contd.*

Diseases. Average Strength 4,133.	Admissions.	Deaths.	Average number constantly sick.	Ratio per 1,000. Admissions.	Deaths.	Constantly sick.
SPECIFIC DISEASES DUE TO INFECTION OR INFESTATION—*contd.*						
Pyrexia of uncertain origin	..	..	..	..	..	..
Rheumatic fever	3	..	0·42	0·7	..	0·10
Sandfly fever	11	..	0·35	2·7	..	0·08
Scarlet fever	1	..	0·09	0·2	..	0·02
Small-pox	..	..	..	..	..	..
Scabies	2	..	0·03	0·5	..	0·01
Tuberculosis — Pulmonary	8	..	2·14	1·9	..	0·52
Tuberculosis — Other	1	..	0·22	0·2	..	0·05
Veneral diseases — Gonorrhœa	85	..	10·54	20·6	..	2·55
Veneral diseases — Soft chancre	11	..	1·83	2·7	..	0·44
Veneral diseases — Syphilis	10	..	0·83	2·4	..	0·20
Veneral diseases — Other V. D.	1	..	0·11	0·2	..	0·03
Typhus fever	..	..	..	..	..	..
Other diseases due to infection or infestation	10	..	0·12	2·4	..	0·03
Other Diseases Classified under systems.						
Diseases of the nervous system	24	1	2·12	5·8	0·24	0·51
Mental diseases	23	..	1·80	5·6	..	0·44
Diseases of the eye	5	..	0·60	1·2	..	0·15
Diseases of the ear and nose	48	..	2·02	11·6	..	0·49
Diseases of the circulatory system. — Valvular diseases of the heart	2	..	0·07	0·5	..	0·02
Diseases of the circulatory system. — Disordered action of the heart	24	..	1·46	5·8	..	0·35
Diseases of the circulatory system. — Other diseases	5	..	0·47	1·2	..	0·11
Diseases associated with abnormalities of the blood	1	.	0·05	0·2	..	0·01
Diseases of the spleen	..	..	..	..	..	..
Diseases of the lymphatic system	10	..	0·37	2·4	..	0·09
Diseases of Ductless or endocrine glands	2	..	0·20	0·5	..	0·05
Diseases of the breast	..	..	..	..	..	..

Diseases of the respiratory system.	Larynx and trachea	3	..	0·57	0·7	..	0·14
	Bronchi and bronchioles	56	..	2·44	13·5	..	0·59
	Lung, other than tuberculosis and pneumonia	..	..	..	..	..	..
	Other diseases	6	..	0·37	1·5	..	0·09
Diseases of the teeth and gums		13	..	0·22	3·1	..	0·05
Diseases of the Digestive system.	Inflammation of tonsils	99	..	2·21	24·0	..	0·53
	Liver diseases	17	..	0·73	4·1	..	0·18
	Other diseases	269	..	10·74	65·1	..	2·60
Diseases due to disorders of nutrition or of metabolism		..	..	..	..	..	..
Diseases of the generative system		34	..	1·40	8·2	..	0·34
Diseases of Bones, Joints, Muscles, Fasciæ and Bursæ		102	..	6·60	24·7	..	1·60
Diseases of the areolar tissue		170	..	6·13	41·1	..	1·48
Diseases of the skin		117	..	5·92	28·3	..	1·43
Diseases of the urinary organs		12	..	0·67	2·9	..	0·16
Injuries	General	1	2	0·13	0·2	0·48	0·03
	Local	234	1	10·64	56·6	0·24	2·57
	In action	..	..	..	..	..	..
Tumours and cysts		5	..	0·29	1·2	..	0·07
Malformations		..	..	..	..	..	..
Poisons		..	..	..	..	..	..
Parasites		..	..	..	..	..	..
No appreciable disease		5	..	0·20	1·2	..	0·05
*Suicides		..	(1)	(0·01)	..	(0·24)	(0·00)
	Total	**2,650**	**6**	**112·51**	**641·2**	**1·45**	**27·22**

*The figures against "Suicides" having already been shown under the heading of the injury, etc., which caused death, are not included in the total.

TABLE IV.

WARRANT OFFICERS, N. C. Os. AND MEN—*contd.*

EASTERN COMMAND.

Table showing the Average Strength, Admissions into Hospital, Deaths and Constantly Sick during the year 1933, with Ratios per 1,000 of the Strength.

Diseases. Average strength 16,105	Admissions.	Deaths.	Average number constantly sick.	Ratio per 1,000. Admissions.	Deaths.	Constantly sick.
Specific Diseases due to infection or infestation.						
Cholera	..	..	..	..	..	..
Dengue	118	..	3·23	7·3	..	0·20
Diphtheria	7	..	0·51	0·4	..	0·03
Dysentery bacillary	106	1	4·85	6·6	0·06	0·30
,, exudate	103	..	5·08	6·4	..	0·32
,, amoebic	74	..	5·18	4·6	..	0·32
,, clinical	101	..	5·03	6·3	..	0·31
Enteric fever (inclusive of typhoid, para. A, B and enteric group)	84	9	11·71	5·2	0·56	0·73
Erysipelas	2	..	0·12	0·0	..	0·01
Influenza	469	2	11·71	29·1	0·12	0·73
Malaria	1,008	..	36·16	62·6	..	2·25
Measles	4	..	0·25	0·2	..	0·02
Meningococcal infection (cerebro-spinal fever)	1	1	0·21	0·1	0·06	0·01
Mumps	3	..	0·11	0·2	..	0·01
Plague	..	..	..	..	..	..
Pneumonia.	71	3	8·06	4·4	0·19	0·50

Pyrexia of uncertain origin	5	..	0·34	0·3	..	0·02
Rheumatic fever	14	..	1·62	0·9	..	0·10
Sandfly fever	466	..	10·54	28·9	..	0·65
Scarlet fever	1	..	0·16	0·1	..	0·01
Small-pox	5	..	0·52	0·3	..	0·03
Scabies	23	..	0·79	1·4	..	0·05
Tuberculosis — Pulmonary	10	..	3·44	0·6	..	0·21
Tuberculosis — Other	..	..	0·21	..	..	0·01
Venereal diseases — Gonorrhoea	390	..	42·21	24·2	..	2·62
Venereal diseases — Soft chancre	110	..	11·83	6·8	..	0·73
Venereal diseases — Syphilis	105	..	8·81	6·5	..	0·55
Venereal diseases — Other V. D.	3	..	0·14	0·2	..	0·01
Typhus fever	5	..	0·63	0·3	..	0·04
Other diseases due to infection or infestation	65	..	2·73	4·0	..	0·17
Other Diseases Classified under Systems.						
Diseases of the nervous system	115	1	6·01	7·1	0·06	0·37
Mental diseases	46	..	6·67	2·9	..	0·41
Diseases of the eye	54	..	2·94	3·4	..	0·18
Diseases of the ear and nose	288	1	8·25	17·9	0·06	0·51
Diseases of the circulatory system — Valvular diseases of the heart	2	..	0·15	0·1	..	0·01
Diseases of the circulatory system — Disordered action of the heart	21	..	1·60	1·3	..	0·10
Diseases of the circulatory system — Other diseases	26	..	1·52	1·6	..	0·09
Diseases associated with abnormalities of the blood	13	..	1·01	0·8	..	0·06
Diseases of the spleen	2	..	0·10	0·1	..	0·01
Diseases of the lymphatic system	63	..	4·01	3·9	..	0·25
Diseases of Ductless or endocrine glands	2	..	0·08	0·1	..	0·00
Diseases of the breast	1	..	0·03	0·1	..	0·00
Diseases of the respiratory system — Larynx and trachea	47	..	1·18	2·9	..	0·07
Diseases of the respiratory system — Bronchi and bronchioles	239	..	8·28	14·8	..	0·51
Diseases of the respiratory system — Lung, other than tuberculosis and pneumonia	6	..	0·46	0·4	..	0·03
Diseases of the respiratory system — Other diseases	31	..	2·41	1·9	..	0·15

TABLE IV—*contd.*

Diseases. Average strength 16,105	Admissions.	Deaths.	Average number constantly sick.	Ratio per 1,000. Admissions.	Deaths.	Constantly sick.
Other Diseases Classified under Systems—contd.						
Diseases of the teeth and gums	41	..	1·22	2·5	..	0·08
Diseases of the Digestive system. — Inflammation of tonsils	429	..	10·67	26·6	..	0·66
Diseases of the Digestive system. — Liver diseases	127	1	8·51	7·9	0·06	0·53
Diseases of the Digestive system. — Other diseases	980	2	36·49	60·9	0·12	2·27
Diseases due to disorders of nutrition or of metabolism	7	..	0·62	0·4	..	0·04
Diseases of the generative system	170	..	7·86	10·6	..	0·49
Diseases of Bones, Joints, Muscles, Fasciæ and Bursæ	331	..	17·75	20·6	..	1·10
Diseases of the areolar tissue	726	..	23·19	45·1	..	1·44
Diseases of the skin	446	..	19·33	27.7	..	1·20
Diseases of the urinary organs	61	..	4·31	3·8	..	0·27
Injuries — General	22	10	0·49	1·4	0·62	0·03
Injuries — Local	892	10	40·41	55·4	0·62	2·51
Injuries — In action	..	..	..	..	..	..
Tumours and cysts	21	..	1·35	1·3	..	0·08
Malformations	2	..	0·11	0·1	..	0·01
Poisons	2	..	0·06	0·1	..	0·00
Parasites	..	..	..	..	..	..
No appreciable disease	52	..	1·55	3·2	..	0·10
*Suicides	(5)	(5)	(0·54)	(0·3)	(0·31)	(0·03)
Total	**8,618**	**41**	**394·80**	**535·1**	**2·55**	**24·51**

*The figures against "Suicides" having already been shown under the heading of the injury, etc., which caused death, are not included in the total.

TABLE V.

WARRANT OFFICERS, N. C. Os. AND MEN—*cont* .

SOUTHERN COMMAND.

Table showing the Average Strength, Admissions into Hospital, Deaths and Constantly Sick, during the year 1933, with Ratios per 1,000 of the Strength.

Diseases. Average strength 15,202	Admissions.	Deaths.	Average number constantly sick.	Ratio per 1,000. Admissions.	Deaths.	Constantly sick.
Specific diseases due to infection or infestation.						
Cholera	..	..	..	..	..	..
Dengue	241	..	5·31	15·9	..	0·35
Diphtheria	37	2	3·65	2·4	0·13	0·24
Dysentery bacillary	188	..	9·21	12·4	..	0·61
„ exudate	102	..	4·01	6·7	..	0·26
„ amœbic	42	..	3·37	2·8	..	0·22
„ clinical	73	..	3·63	4·8	..	0·24
Enteric fever (inclusive of Typhoid, Para. A, B and enteric group).	16	1	2·77	1·1	0·07	0·18
Erysipelas	2	..	0·14	0·1	..	0·01
Influenza	182	1	4·42	12·0	0·07	0·29
Malaria	922	2	28·58	60·6	0·13	1·88
Measles	2	..	0·11	0·1	..	0·01
Meningococcal infection (cerebro-spinal fever)	2	1	0·45	0·1	0·07	0·03
Mumps	6	..	0·28	0·4	..	0·02
Plague	..	..	..	..	..	..
Pneumonia	42	6	3·65	2·8	0·39	0·24

TABLE V—*contd.*

Diseases. Average strength—15,202.	Admissions.	Deaths.	Average number constantly sick.	Ratio per 1,000. Admissions.	Deaths.	Constantly sick.
Specific diseases due to infection or infestation—contd.						
Pyrexia of uncertain origin	40	..	1·83	2·6	..	0·12
Rheumatic fever	21	..	2·40	1·4	..	0·16
Sandfly fever	237	..	5·29	15·6	..	0·35
Scarlet fever	2	..	0·14	0·1	..	0·01
Small-pox	2	..	0·23	0·1	..	0·02
Scabies	21	..	0·77	1·4	..	0·05
Tuberculosis — Pulmonary	10	1	3·41	0·7	0·07	0·22
Tuberculosis — Other	6	1	1·05	0·4	0·07	0·07
Venereal diseases — Gonorrhœa	363	..	52·36	23·9	..	3·44
Venereal diseases — Soft chancre	74	..	8·08	4·9	..	0·53
Venereal diseases — Syphilis	58	..	5·36	3·8	..	0·35
Venereal diseases — Other V. D.	1	..	0·03	0·1	..	0·00
Typhus fever	11	..	1·00	0·7	..	0·07
Other diseases due to infection or infestation	112	1	3·57	7·4	0·07	0·23
Other diseases classified under systems.						
Diseases of the nervous system	101	..	8·18	6·6	..	0·54
Mental diseases	69	1	16·10	4·5	0·07	1·06
Diseases of the eye	60	..	2·75	3·9	..	0·18
Diseases of the ear and nose	277	2	9·95	18·2	0·13	0·65
Diseases of the Circulatory system — Valvular diseases of the heart	14	..	0·97	0·9	..	0·06
Diseases of the Circulatory system — Disordered action of the heart	61	2	3·91	4·0	0·13	0·26
Diseases of the Circulatory system — Other diseases	16	1	1·28	1·1	0·07	0·08
Diseases associated with abnormalities of the blood	7	1	0·20	0·5	0·07	0·01
Diseases of the spleen	..	..	..	..	..	..
Diseases of the lymphatic system	94	..	5·89	6·2	..	0·39
Diseases of Ductless or endocrine glands	8	..	1·57	0·5	..	0·10
Diseases of the breast	2	..	0·13	0·1	..	0·01

Diseases of the Respiratory system.	Larynx and trachea	17	..	0·58	1·1	..	0·04
	Bronchi and bronchioles	241	..	9·64	15·9	..	0·63
	Lung, other than tuberculosis and pneumonia.	1	..	0·35	0·1	..	0·02
	Other diseases	22	..	2·43	1·4	..	0·16
Diseases of the teeth and gums		36	..	1·00	2·4	..	0·07
Diseases of the Digestive system.	Inflammation of tonsils	556	..	14·01	36·6	..	0·92
	Liver diseases	124	1	7·64	8·2	0·07	0·50
	Other diseases	860	3	35·08	56·6	0·20	2·31
Diseases due to disorders of nutrition or of metabolism		2	..	0·10	0·1	..	0·01
Diseases of the generative system		208	..	9·70	13·7	..	0·64
Diseases of Bones, Joints, Muscles, Fasciæ and Bursæ		350	..	19·55	23·0	..	1·29
Diseases of the areolar tissue		832	..	31·93	54·7	..	2·10
Diseases of the skin		380	..	19·67	25·0	..	1·29
Diseases of the urinary organs		83	2	5·35	5·5	0·13	0·35
Injuries	General	15	4	0·27	1·0	0·26	0·02
	Local	932	8	42·19	61·3	0·53	2·78
	Other diseases	..	..	..	..	..	..
Tumours and cysts		36	1	1·80	2·4	0·07	0·12
Malformations		7	..	0·70	0·5	..	0·05
Poisons		6	1	0·22	0·4	0·07	0·01
Parasites		..	..	..	..	..	..
No appreciable disease		67†	..	2·47	4·4	..	0·16
Suicides*		(6)	(7)	(0·30)	(0·4)	(0·46)	(0·02)
	Total	**8,299**	**43**	**410·71**	**545·9**	**2·83**	**27·02**

*The figures against "Suicides" having already been shown under the injury, etc. which caused death, are not included in the total.
† Includes figures for carriers.

TABLE VI.

WARRANT OFFICERS, N. C. Os. AND MEN—*contd.*

BURMA DISTRICT.

Table showing the average strength, admissions into hospital, deaths and constantly sick, during the year 1933, with ratios per 1,000 of the strength.

Diseases.	Admissions.	Deaths.	Average number constantly sick.	Ratio per 1,000.		
				Admissions.	Deaths.	Constantly sick.
Average strength—1,807.						
Specific diseases due to infection or infestation.						
Cholera	..	..	..	..	..	..
Dengue	264	..	5·15	146·1	..	2·85
Diphtheria	1	..	0·08	0·1	..	0·04
Dysentery bacillary	22	..	0·88	12·2	..	0·49
„ exudate	9	..	0·28	5·0	..	0·15
„ amœbic	3	..	0·25	1·7	..	0·14
„ clinical	2	..	0·07	1·1	..	0·04
Enteric fever (inclusive of typhoid, para. A, B and enteric group).	2	..	0·32	1·1	..	0·18
Erysipelas	3	..	0·15	1·7	..	0·08
Influenza	15	..	0·52	8·3	..	0·29
Malaria	72	..	2·53	39·8	..	1·40
Measles	..	..	..	..	..	..
Meningococcal infection (cerebro-spinal fever)	..	..	..	..	..	..
Mumps	..	..	..	..	..	..
Plague	..	..	..	..	..	..
Pneumonia	3	..	0·16	1·7	..	0·09

Pyrexia of uncertain origin	..	..	..	..	..	..
Rheumatic fever	..	..	..	..	..	..
Sandfly fever	13	..	0·29	7·2	..	0·16
Scabies	21	..	0·91	11·6	..	0·50
Scarlet fever	1	..	0·08	0·1	..	0·04
Small-pox	..	..	..	..	..	..
Tuberculosis — Pulmonary	1	..	0·54	0·1	..	0·30
Tuberculosis — Other	..	..	..	..	..	..
Venereal diseases — Gonorrhœa	89	..	11·99	49·3	..	6·64
Venereal diseases — Soft chancre	28	..	3·06	15·5	..	1·69
Venereal diseases — Syphilis	24	..	1·75	13·3	..	0·97
Venereal diseases — Other V. D.	..	..	..	..	..	..
Typhus fever	..	..	..	..	..	..
Other diseases due to infection or infestation	8	..	0·14	4·4	..	0·08
Other diseases classified under systems.						
Diseases of the nervous system	9	1	0·38	5·0	0·55	0·21
Mental diseases	5	..	0·61	2·8	..	0·34
Diseases of the eye	4	.	0·15	2·2	..	0·08
Diseases of the ear and nose	48	..	1·85	26·6	..	1·02
Diseases of the Circulatory system. — Valvular diseases of the heart	1	..	0·13	0·1	..	0·07
Diseases of the Circulatory system. — Disordered action of the heart	4	..	0·12	2·2	..	0·07
Diseases of the Circulatory system. — Other diseases	1	..	0·05	0·1	..	0·03
Diseases associated with abnormalities of the blood	1	1	0·04	0·1	0·55	0·02
Diseases of the spleen	..	..	..	..	..	..
Diseases of the lymphatic system	16	..	1·16	8·9	..	0·64
Diseases of Ductless or endocrine glands	..	..	..	..	..	..
Diseases of the breast	..	..	..	..	..	..
Diseases of the Respiratory system. — Larynx and trachea	..	..	..	..	..	..
Diseases of the Respiratory system. — Bronchi and bronchioles	22	..	1·16	12·2	..	0·64
Diseases of the Respiratory system. — Lung, other than tuberculosis and pneumonia.	1	..	0·06	0·1	..	0·03
Diseases of the Respiratory system. — Other diseases	8	..	0·26	4·4	..	0·14

TABLE VI—*contd.*

Diseases.	Admissions.	Deaths.	Average number constantly sick.	Ratio per 1,000.		
Average strength—1,807.				Admissions.	Deaths.	Constantly sick.
Diseases of the teeth and gums	6	..	0·11	3·3	..	0·06
Diseases of the Digestive system. — Inflammation of tonsils	64	..	1·63	35·4	..	0·90
Diseases of the Digestive system. — Liver diseases	8	..	0·59	4·4	..	0·33
Diseases of the Digestive system. — Other diseases	77	..	2·94	42·6	..	1·63
Diseases due to disorders of nutrition or of metabolism	..	..	..	..	..	..
Diseases of the generative system	32	..	1·45	17·7	..	0·80
Diseases of Bones, Joints, Muscles, Fasciæ and Bursæ	60	..	3·41	33·2	..	1·89
Diseases of the areolar tissue	132	..	6·53	73·0	..	3·61
Diseases of the skin	69	..	3·23	38·2	..	1·79
Diseases of the urinary organs	7	..	0·42	3·9	..	0·23
Injuries — General	..	..	..	..	..	..
Injuries — Local	103	1	5·15	57·0	0·55	2·85
Injuries — In action	..	..	..	..	..	..
Tumours and cysts	3	..	0·09	1·7	..	0·05
Malformations	..	..	..	..	..	..
Poisons	..	..	..	..	..	..
Parasites	..	..	..	..	..	..
No appreciable diseases	4	..	0·10	2·2	..	0·06
Suicides	..	..	..	..	..	..
Total	**1,266**	**3**	**60·77**	**700·6**	**1·66**	**33·63**

TABLE VII.

BRITISH OTHER RANKS.

Table showing monthly ratios per 1,000 of the strength of admissions for certain diseases for All-India during the year 1933.

1933:	Enteric group of fevers.	Influenza.	Cholera.	Small-pox.	Malaria.	Dysentery protozoal.	Dysentery bacillary.	Dysentery bacillary exudative.	Dysentery group.	Pyrexia of uncertain origin.	Pneumonia (Lobar and Lobular).	Diarrhœa.	Dengue.	Sandfly fever.	Plague.	Effects of Heat.	All Causes.
January	0·2	5·0		0·1	2·2	0·2	0·1	0·4	0·1	0·0	0·2	0·6	0·2	0·3	..	..	41·0
February	0·1	3·0	..	0·1	1·9	0·1	0·2	0·4	0·3	0·2	0·4	0·9	0·2	0·5	..	0.0	36·6
March	0·1	3·2	..	0·0	1·7	0·1	0·9	0·6	0·5	..	0·3	0·9	0·3	1·2	..	0.0	41·3
April	0·4	2·0		0·1	1·7	0·3	0·5	0·6	0·9	0·0	0·5	2·6	0·9	3·1	..	0.0	45·0
May	0·5	1·2	..	..	3·5	0·4	1·0	0·5	0·7	0·1	0·3	2·0	1·6	6·2	..	0.2	51·7
June	0·2	1·8	..	..	3·9	0·2	1·3	0·6	0·5	0·2	0·4	1·2	1·2	8·5	..	0.5	54·6
July	0·3	0·8	..	0·0	6·7	0·3	0·8	0·5	0·6	0·1	0·1	1·2	1·1	7·1	..	1.0	57·2
August	0·4	0·8	..	..	9·6	0·4	0·8	0·6	0·7	0·0	0·2	1·5	0·4	5·5	..	0.1	56·8
September	0·3	0·7	..	..	17·8	0·3	1·0	0·5	0·5	0·1	0·1	1·3	1·1	3·3	..	..	59·1
October	0·4	0·3	..	..	30·2	0·2	0·8	0·6	0·3	0·1	0·1	0·8	2·5	2·9	..	..	70·4
November	0·1	0·7	..	..	18·0	0·2	0·8	0·7	0·4	0·0	0·2	1·0	1·0	1·2	..	..	55·0
December	0·1	0.5	0·0	..	5·7	0·2	0·4	0·6	0·2	0·0	0·3	1·0	1·0	0·3	..	0.0	39·1
Total	3·1	20·2	0·0	0·2	102·3	3·1	1·5	6·6	5·6	0·9	3·1	15·1	11·5	40·0	..	1·8	607·0

TABLE

BRITISH

Table showing ratios per 1,000 of strength of admissions for certain India during 1933.

Stations and Districts.	Average annual strength.	Enteric group of fevers.					Dysentery.			
		Typhoid fever.	Para. A.	Para. B.	Para. C.	Enteric group.	Bacillary Bact.	Bacillary exudate.	Protozoal.	Clinical.
Cherat	296	3·4	...	...	...	3·4	...	3·4	...	3·4
Landikotal	817	1·2	...	1·2	...	7·3	6·1	17·1	2·4	3·7
Nowshera	1,609	1·2	...	...	...	2·5	1·9	1·9	...	9·3
Peshawar	1,674	0·6	...	...	...	2·4	10·8	17·9	0·6	11·9
Risalpur	304	6·6	...	...	...	...	3·3	3·3	...	...
Peshawar District	4,704	1·5	...	0·2	...	3·2	5·7	10·4	0·6	8·3
Kohat	153	...	...	...	...	...	6·5	...	19·6	...
Thal	14	...	...	...	...	...	...	...	...	...
Kohat District	169	...	...	...	...	...	5·9	...	17·8	...
Abbottabad	166	...	...	...	...	...	24·1	24·1	6·0	12·0
Barian	247	4·0	...	...	...	...	...	...	4·0	...
Campbellpore	204	...	...	...	...	...	4·9	4·9	...	...
Gharial	344	...	...	...	...	...	8·7	2·9	...	...
Jhelum	6	...	...	...	...	...	...	...	...	...
Kalabagh (Hazara)	76	13·2	...	...	...	26·3	...	...	...	39·5
Khanspur	208	...	...	...	...	...	...	...	...	...
Kuldana	389	...	...	...	...	5·1	...	...	2·6	...
Murree	174	...	...	...	...	...	...	...	11·5	11·5
Rawalpindi	2,309	1·3	0·4	...	...	0·4	7·4	3·5	3·9	9·1
Upper Topa	100	...	...	...	...	...	...	...	...	30·0
Rawalpindi District	4,402	1·1	0·2	...	...	1·1	5·7	3.2	3·2	7·0
Ambala	756	...	...	...	...	...	5·3	...	5·3	11·9
Amritsar	153	...	...	...	...	6·5	...	32·7	...	...
Dagshai	442	4·7	...	...	...	...	2·4	2·4	2·4	...
Dalhousie	478	2·1	2·1	...	...	...	2·1	6·3	..	4·2
Ferozepore	819	1·2	...	...	...	2·4	1·2	8·5	...	...
Jullundur	728	...	...	...	...	...	2·7	5·5	...	5·5
Jutogh	181	...	...	...	...	...	...	5·5	...	5·5
Kasauli	296	...	...	...	...	3·3	3·3	13·5	...	...
Lahore	1,061	0·9	...	...	...	3·8	0·9	7·5	0·9	2·8
Multan	615	...	...	...	...	14·6	1·6	6·5	1·6	14·6
Subathu	190	...	...	...	...	5·3	...	...	...	...
Sialkot	1,033	1·0	...	...	...	2·9	9·7	5·8	7·7	11·6
Solon	133	7·5	...	...	...	...	...	...	15·0	7·5
Lahore District	7,137	1·0	0·1	...	...	2·9	3·1	6·0	2·4	5·7
Bannu	100	...	...	...	...	...	10·0	...	...	...
Dera Ismail Khan	48	...	...	...	...	...	...	...	...	
Kalabagh and Marl Indus	3	...	...	...	...	...	...	...	...	...
Manzai	13	...	...	...	...	...	...	...	...	...
Razmak	1,076	...	...	...	...	0·9	16·7	0·9	0·9	0·9
Mir Ali	22	...	...	...	...	...	45·5	45·5	...	...
Wana	75	...	...	...	...	...	...	13·3	...	...

VIII.

OTHER RANKS.

diseases and constantly sick for all causes in each station and district in

Diarrhœa	Cholera	Venereal diseases.	Small pox.	Malaria.	Dengue.	Sandfly fever.	Plague.	Influenza.	Pneumonia (Lobar and Lobular).	Heat-stroke.	Heat-exhaustion.	All Causes.	Average annual number constantly sick.
27·0	..	10·1	..	37·2	..	27·0	..	3·4	..	..	..	462·8	16·93
17·1	..	8·6	1·2	82·0	..	495·7	..	56·3	2·4	..	8·6	1,198·3	33·97
11·8	0.6	9·9	1·2	306·4	..	161·6	..	33·6	2·5	2·5	13·1	958·4	29·67
29·9	..	26·9	..	389·5	..	243·7	..	10·8	3·0	0·6	5·4	1,065·7	37·97
52·6	..	3·3	..	13·2	..	115·1	..	36·2	3·3	..	..	572·4	16·41
22·7	0.2	15·3	0·6	260·8	..	237·2	..	27·6	2·6	1·1	7·9	981·3	31·69
6·5	..	13·1	..	209·2	..	32·7	..	6·5	..	..	..	640·5	28·14
..	..	..	..	..	..	..	..	..	..	..	..	71·4	0·71
5·9	..	11·8	..	189·3	..	29·6	..	5·9	..	..	..	585·8	21·01
48·2	..	18·1	..	114·5	..	6·0	..	6·0	..	..	..	662·7	23·31
8·1	..	48·6	..	85·0	..	8·1	..	..	4·0	..	..	473·7	48·06
14·7	..	98·0	..	73·5	..	63·7	..	4·9	4·9	4·9	29·4	661·8	15·84
14·5	..	8·7	..	37·8	..	..	..	5·8	..	..	..	465·1	15·96
..	..	..	..	..	..	..	..	16·7	..	..	..	33·3	0·17
..	..	..	..	..	..	..	..	..	..	..	..	407·9	14·08
9·6	..	9·6	..	91·3	..	9·6	..	..	4·8	..	..	372·2	9·90
10·3	..	23·1	..	28·3	..	2·6	..	7·7	..	..	..	492·3	10·28
11·5	..	..	..	34·5	..	5·7	..	..	5·7	..	5·7	419·5	78·10
25·6	..	42·9	..	88·8	..	68·0	..	15·2	6·5	0·4	0·4	635·8	28·22
50·0	..	10·0	..	90·0	..	..	..	50·0	..	..	..	470·0	12·90
20·4	..	33·8	..	72·2	..	40·2	..	10·9	4·8	0·5	1·8	542·3	25·14
6·6	..	52·9	..	207·7	..	55·6	..	5·8	..	..	..	809·5	37·14
39·2	..	32·7	6·5	143·8	..	6·5	..	58·8	..	..	6·5	947·7	27·45
4·7	..	28·3	..	37·7	..	4·7	..	4·7	..	..	..	400·9	13·63
20·9	..	2·1	..	35·6	..	..	..	18·8	2·1	..	..	529·3	25·36
14·7	..	34·2	..	206·3	..	69·6	..	14·7	3·7	1·2	7·3	666·7	25·59
17·9	..	13·7	..	15·1	5·5	19·2	..	20·6	..	..	..	475·3	18·23
..	..	27·6	..	16·6	..	..	..	16·6	5·5	..	..	309·4	11·93
3·3	..	30·4	..	189·2	..	..	..	..	..	..	..	638·5	40·37
30·2	..	47·1	..	80·1	..	60·3	..	0·9	1·9	0·9	5·7	673·9	39·65
27·6	..	42·3	..	232·5	3·3	9·8	..	32·5	3·3	..	13·0	1,029·3	35·93
..	..	5·3	..	57·9	..	68·4	..	..	5·3	..	..	389·5	10·79
24·2	..	35·8	..	333·0	..	7·7	..	39·7	3·9	..	..	961·3	37·64
15·0	..	15·0	..	22·6	..	7·5	..	..	..	..	..	406·0	11·13
18·9	..	31·7	0.1	145·3	0·8	29·1	..	16·3	2·0	0·3	2·9	670·6	28·74
50·0	..	10·0	..	450·0	..	110·0	..	20·0	..	..	10·0	1,010·0	40·60
..	..	20·8	..	541·7	..	..	..	20·8	..	..	..	895·8	23·38
..	..	..	..	333·3	..	..	..	..	..	..	333·3	666·7	30.00
76·9	..	..	..	76·9	..	..	..	..	153·8	..		538·5	15·38
3·7	..	12·1	..	87·4	..	..	..	..	6·5	..	0·9	480·7	20.38
45·5	..	..	..	90·9	..	..	..	..	..	..	..	909·1	2·73
..	..	..	..	360·0	..	26·7	..	..	13·3	..	..	1,080·0	98·98

TABLE

Stations and Disiricts.	Average annual strength.	Enteric group of fevers.					Dysentery.			
		Typhoid fever.	Para. A.	Para. B.	Para. C.	Enteric group.	Bacillary Bact.	Bacillary exudate.	Protozoal.	Clinical.
Waziristan District . .	1,337	...	...	...	...	0·7	15·0	2·2	0·7	0·7
Quetta	2,577	0·8	0·4	...	...	0·4	27·9	12·8	3·9	10·5
Baluchistan District . .	2,577	0·8	0·4	...	...	0·4	27·9	12·8	3·9	10·5
Loralai	50	...	...	...	...	...	...	...	...	...
Zhob Bde. Area . . .	50	...	...	...	...	...	...	...	...	...
Hyderabad . . .	384	2·6	...	...	...	2·6	5·2	...	...	2·6
Karachi	1,122	...	...	...	...	0·9	11·6	...	...	2·7
Sind Bde. Area . . .	1,506	0·7	...	...	...	1·3	10·0	...	...	2·7
Bareilly	833	...	...	...	...	3·6	7·2	9.6	7·2	14·4
Chakrata	645	...	...	...	...	6·2	...	1·6	...	1·6
Dehra Dun . . .	27	...	...	...	...	...	...	...	...	...
Jhansi	1,241	0·8	0·8	...	...	1·6	9·7	10·5	4·8	20·1
Landour	66	...	...	...	...	...	...	15·2	...	...
Meerut	1,945	1·0	...	...	...	4·1	8·2	9·3	13·4	10·8
Ranikhet	1,174	0·9	...	...	...	5·1	2·6	4·3	2·6	1·7
Roorkee	37	...	...	...	...	...	...	...	...	..
Meerut District . . .	5,979	0·7	0·2	...	...	3·8	6·2	7·7	6·9	10·2
Allahabad . . .	822	3·6	9·7	...	...	4·9	15·8	23·1	4·9	1·2
Benares	147	...	...	...	...	...	6·8	6·8	...	...
Cawnpore . . .	792	...	...	...	...	...	1·3	...	...	5·1
Fyzabad	749	1·3	...	...	...	5·3	2·7	1·3	...	1·3
Lucknow	2,121	...	...	...	...	2·8	7·5	9·4	2·4	0·5
Lucknow District . .	4,764	0·8	1·7	...	...	2·9	6·9	8·6	1·9	1·5
Calcutta	1,060	0·9	...	...	...	...	6·6	5·7	5·7	5·7
Barrackpore . . .	558	...	...	...	...	3·6	1·8	...	19·7	3·6
Dinapore	676	16·3	...	...	...	8·9	...	10·7	5·9	...
Lebong	551	...	...	...	...	...	...	1·8	...	10·9
Dacca . . .	555	...	...	...	...	...	...	...	5·4	9·0
P. & A. District . .	3,340	3·6	...	...	...	2·4	2·4	4·2	7·2	5·7
Agra	772	1·3	...	...	...	1·3	5·2	3·9	1·3	2·6
Delhi	976	1·0	...	...	...	2·0	4·1	3·1	...	4·1
Muttra	274	10·9	...	...	...	10·9	...	...	3·6	10·9
Delhi Ind. Bde. . . .	2,022	2·5	...	...	...	3·0	4·0	3·0	1·0	4·5
Ahmednagar . . .	898	1·1	...	...	...	...	7·8	3·3	6·7	...
Jubbulpore . . .	1,344	...	...	...	...	...	8·2	6·7	3·7	3·7
Kamptee . . .	747	...	...	...	...	...	...	1·3	...	9·4
Secunderabad . . .	2,743	...	...	...	...	1·8	21·9	12·0	4·4	9·8
Pachmarhi . . .	64	...	...	...	...	...	...	...	...	...
Saugor	22	...	...	...	...	...	...	...	...	...

VIII.—*contd.*

Diarrhœa	Cholera.	Venereal diseases.	Small pox.	Malaria.	Dengue.	Sandfly fever.	Plague.	Influenza.	Pneumonia (Lobar and Lobular).	Heat-stroke.	Heat-exhaustion.	All Causes.	Average annual number constantly sick.
8·2	..	11·2	..	146·6	..	9·7	..	2·2	7·5	..	2·2	584·9	22·15
14·4	..	24·4	..	226·6	..	..	..	50·8	2·7	..	..	698·5	27·64
14·4	..	24·4	..	226·6	..	..	..	50·8	2·7	..	..	698·5	27·64
..	..	..	..	440·0	..	..	..	..	..	..	..	480·0	9·40
..	..	..	..	440·0	..	..	..	..	..	..	..	480·0	9·40
10·4	..	20·8	..	208·3	..	23·4	..	18·2	..	..	..	533·9	18·52
8·0	..	27·6	..	139·0	12·5	0·9	..	21·4	2·7	..	..	521·4	28·58
8·6	..	25·9	..	156·7	9·3	6·6	..	20·6	2·0	..	..	524·6	26·02
12·0	..	27·6	..	21·6	3·6	7·2	..	73·2	1·2	..	..	549·8	23·41
20·2	..	23·3	..	72·9	..	..	..	..	..	..	..	396·9	18·11
..	..	..	..	148·1	..	..	..	..	..	..	..	370·4	7·41
38·7	..	28·2	..	49·2	..	32·2	..	38·7	8·9	1·6	..	622·9	23·80
..	..	75·8	..	30·3	..	..	..	30·3	..	..	..	303·0	7·12
6·7	..	21·1	..	34·4	..	25·2	..	4·6	4·1	..	0·5	542·9	28·22
11·9	..	12·8	..	11.1	..	..	..	16·2	0·9	..	..	338·2	27·84
..	..	..	..	..	..	..	..	..	..	..	..	54·1	0·27
16·4	..	22·4	..	35·5	0·5	15·9	..	23·2	3·5	0·3	0·2	497·1	24·92
8·5	..	30·4	..	40·1	3·6	71·8	..	19·5	9·7	..	..	689·8	27·01
40·8	..	61·2	..	13·6	..	210·9	..	..	..	6·8	..	836·7	33.74
13·9	..	73·2	..	36·6	..	29·0	..	10·1	5·1	2·5	..	513·9	21·99
17·4	..	29·4	..	1·3	..	10·7	..	..	1·3	..	..	356·5	14·68
5·7	..	44·8	1·4	10·4	..	47·1	..	17·9	..	..	..	357·9	17·75
10·3	..	43·9	0·6	18·3	0·6	46·4	..	13·0	2·7	0·6	..	445·6	19·56
5·7	..	37·7	..	52·8	47·2	..	..	24·5	11·3	..	..	495·3	26·67
10·8	..	71·7	..	37·6	19·7	..	..	9·0	5·4	..	..	406·8	27·44
7·4	..	42·9	..	3·0	14·8	26·6	..	22·2	5·9	..	..	403·8	19·81
12·7	..	29·0	..	29·0	1·8	..	..	176·0	3·6	..	..	620·7	22·07
7·2	..	27·0	..	127·9	3·6	..	..	34·2	..	..	..	618·0	17·17
8·4	..	41·9	..	49·7	22·2	5·4	..	48·5	6·3	..	..	512·0	23·55
46·6	..	51·8	5·2	243·5	32·4	49·2	..	36·3	11·7	..	2·6	804·4	34·25
21·5	..	64·5	..	309·4	..	17·4	..	58·4	1·0	..	..	982·6	40·42
36·5	..	18·2	..	164·2	..	153·3	..	51·1	..	10·9	3·6	832·1	25·47
33·1		53·4	2·0	264·6	12·4	48·0	..	49·0	4·9	1·5	1·5	894·2	36·04
13·4	...	18·9	..	181·5	..	38·4	..	14·5	3·3	...	1·1	704·9	17·74
11·2	...	28·3	0·7	73·7	..	3·7	..	..	5·2	..	1·5	628·0	30·43
16·1	...	32·1	...	26·8	4·0	25·4	..	29·5	1·3	..	..	535·5	18·80
13·1	..	32·1	..	10 9	2·2	37·9	..	1·5	2·6	..	..	476·1	25·84
31·3	..	15·6	..	234·4	..	..	..	15·6	..	..	..	421·9	6·72
..	..	..	..	90·9	..	..	..	45·5	..	..	..	954·5	15·4

TABLE

Stations and Districts.	Average annual strength.	Enteric group of fevers.					Dysentery.			
		Typhoid fever.	Para. A.	Para. B.	Para. C.	Enteric group.	Bacillary Bact.	Bacillary exudate.	Protozoal.	Clinical.
Deccan District	5,818	0·2	...	...	...	0·9	13·4	7·9	4·0	6·7
Mhow	1,538	...	...	...	...	...	15·0	2·0	0·7	5·9
Mount Abu	68	...	...	...	...	...	...	...	...	14·7
Nasirabad	788	1·3	1·3	...	...	1·3	11·4	10·2	5·1	...
Ahmedabad	137	...	...	...	...	...	7·3	7·3	...	21·9
Colaba	775	...	...	...	...	...	3·9	2·6	...	3·9
Deolali	495	...	...	...	...	2·0	...	8·1	...	...
Bombay District	3,801	0·3	0·3	...	...	0·5	9·5	4·7	1·3	4·2
Belgaum	70	...	...	...	...	...	28·6	...	...	...
Poona	2,371	0·8	...	...	...	...	18·1	4·2	3·0	3·4
Purandhar	71	...	...	...	...	...	...	...	14·1	...
Poona Bde. Area	2,512	0·8	...	...	...	...	17·9	4·0	3·2	3·2
Bangalore	1,295	...	...	...	...	0·8	12·4	13·9	0·8	0·8
Madras	758	...	...	...	...	1·3	2·6	13·2	2·6	1·3
Malapurum	227	...	...	...	...	...	...	...	...	...
Wellington	791	...	...	...	...	...	2·5	...	3·8	...
Madras District	3,071	...	...	...	...	0·7	6·5	9·1	2·0	0·7
Mandalay	126	...	...	...	...	...	15·9	...	...	...
Maymyo	724	...	...	...	...	...	8·3	4·1	1·4	...
Mingaladon	816	...	...	...	...	1·2	18·4	8·6	2·5	3·7
Port Blair	141	...	...	...	...	7·1	...	...	...	...
Burma District	1,807	...	...	...	...	1·1	12·7	5·5	1·7	1·7
INDIA	54,996	0·9	0·2	0·0	...	1·9	8·5	6·6	3·1	5·6

VIII—*concld.*

Diarrhœa.	Cholera.	Venereal diseases.	Small-pox.	Malaria.	Dengue.	Sandfly fever.	Plague.	Influenza.	Pneumonia (Lobar and Lobular).	Heat-stroke.	Heat-exhaustion.	All Causes.	Average annual number constantly sick.
13·2	..	28·9	0·2	56·5	1·5	27·2	..	7·0	3·1	..	0·5	555·3	24·50
19·5	..	11·7	..	98·2	..	0·7	..	25·4	1·3	..	..	587·1	25·68
29·4	..	..	..	73·5	..	..	..	14·7	14·7	..	..	544·1	14·41
26·6	..	35·5	..	95·2	..	47·0	..	3·8	3·8	..	..	520·3	19·38
14·6	..	29·2	..	182·5	21·9	..	..	..	7·3	..	..	591·2	15·18
3·9	..	36·1	..	51·6	..	5·2	..	80·0	5·2	..	..	700·6	34·72
16·2	..	14·1	..	94·9	..	40·4	..	..	..	..	..	436·4	18·32
17·4	..	22·4	..	90·2	0·8	11·6	..	27·6	2·9	..	..	576·2	24·66
28·6	..	42·9	..	14·3	..	..	..	28·6	..	..	..	642·9	11·43
4·2	..	24·9	0·4	84·4	..	9·7	..	7·2	2·5	..	..	517·9	37·57
14·1	..	..	..	98·6	..	..	..	14·1	..	..	..	507·0	30·42
5·2	..	24·7	0.4	82·8	..	9·2	..	8·0	2·4	..	..	521·1	36·64
9·3	..	60·2	..	6·9	61·0	..	..	..	..	..	..	468·0	28·45
7·9	..	97·6	..	4·0	211·1	..	..	13·2	1·3	..	6·6	791·6	36·91
8·8	..	30·8	..	13·2	..	..	..	..	..	..	..	361·2	17·49
8·8	..	15·2	..	11·4	..	1·3	..	1·3	2·5	..	..	276·9	16·30
8·8	..	55·7	..	7·8	77·8	0·3	..	3·6	1·0	..	1·6	490·7	26·60
..	..	150·8	..	23·8	79·4	..	..	..	..	..	..	841·3	33·25
6·9	..	63·5	..	49·7	6·9	..	..	13·8	..	..	..	471·0	31·49
8·6	..	83·3	..	27·0	291·7	..	..	..	..	..	..	894·6	38·22
..	..	28·4	..	63·8	21·3	92·2	..	7·1	..	..	..	510·6	18·51
6·6	..	75·8	..	38·7	141·7	7·2	..	6·1	..	..	..	691·2	33·64
15·1	..	32·4	0·2	102·3	11·5	40·0	..	29·2	3·1	0·3	1·5	607·0	26·79

TABLE IX.

BRITISH OFFICERS.

Table showing the Average strength, Admissions into hospital, Deaths and Constantly sick, during the year 1933, with Ratios per 1,000 of the strength.

Diseases.	Admissions.	Deaths.	Average number constantly sick.	Ratio per 1,000. Admissions.	Deaths.	Constantly sick.
Average strength . . . . . 2,355.						
Specific diseases due to infection or infestation.						
Cholera	..	..	..	..	..	..
Dengue	21	..	0·50	8·9	..	0·21
Diphtheria	2	..	0·16	0·8	..	0·07
Dysentery bacillary	20	..	0·71	8·5	..	0·30
,, exudate	15	..	0·52	6·4	..	0·22
,, amœbic	5	..	0·22	2·1	..	0·09
,, clinical	11	..	0·32	4·7	..	0·14
Enteric fever (inclusive of typhoid, para. A, B and enteric group).	7	..	0·87	3·0	..	0·37
Erysipelas	..	..	..	..	..	..
Influenza	46	1	0·90	19·5	0.42	0·38
Malaria	107	..	3.00	45·4	..	1·27
Measles	..	..	..	..	..	..
Meningococcal infection (cerebro-spinal fever)	..	..	..	..	..	..
Mumps	1	..	0·06	0·4	..	0·03
Plague	..	..	..	..	..	..
Pneumonia	9	5	0·92	3·8	..	0·39
Pyrexia of uncertain origin	4	..	0·12	1·7	..	0·05
Rheumatic fever	2	..	0·08	0·8	..	0·03
Sandfly fever	65	..	1·02	27·6	..	0·43
Scarlet fever	1	..	0·06	0·4	..	0·03
Scabies	..	..	..	..	..	..
Small-pox	3	..	0·23	1·3	..	0·10
Tuberculosis { Pulmonary	..	..	..	..	..	..
Tuberculosis { Other	..	..	..	..	..	..

Venereal diseases — Gonorrhœa	..	..	..	..	..	..
Venereal diseases — Soft chancre	..	..	..	..	..	..
Venereal diseases — Syphilis	..	..	..	..	..	..
Venereal diseases — Other V. D.	..	..	..	..	..	
Typhus fever	4	1	0·20	1·7	0·42	0·08
Other diseases due to infection or infestation	13	1	0·28	5·5	0 42	0·12
Other diseases classified under systems.						
Diseases of the nervous system	18	1	1·21	7.6	0·42	0·51
Mental diseases	1	..	0·15	0·4	..	0·06
Diseases of the eye	7	..	0·27	3·0	..	0·11
Diseases of the ear and nose	30	..	0·76	12·7	..	0·32
Diseases of the circulatory system. — Valvular diseases of the heart	2	1	0·29	0·8	0·42	0·12
Diseases of the circulatory system. — Disordered action of the heart	1	..	0·03	0·4	..	0·01
Diseases of the circulatory system. — Other diseases	13	1	0·83	5·5	0·42	0·35
Diseases associated with abnormalities of the blood	..	..	..	..	..	..
Diseases of the spleen	..	..	..	..	..	..
Diseases of the lymphatic system	7	..	0·17	3·0	..	0·07
Diseases of Duc less or endocrine glands	..	..	..	..	..	..
Diseases of the breast	..	..	..	..	..	..
Diseases of the respiratory system. — Larynx and trachea	..	..	..	..	..	..
Diseases of the respiratory system. — Bronchi and bronchioles	15	..	0·53	6·4	..	0·23
Diseases of the respiratory system. — Lung, other than tuberculosis and pneumonia.	..	..	..	..	..	..
Diseases of the respiratory system. — Other diseases	1	..	0·03	0 4	..	0·01
Diseases of the teeth and gums	9	..	0·13	3·8	..	0·06
Diseases of the digestive system. — Inflammation of tonsils	38	..	0·81	16·1	..	0·34
Diseases of the digestive system. — Liver diseases	68	1	3·65	28·9	0·42	1·55
Diseases of the digestive system. — Other diseases	171	1	5·11	72·6	0·42	2·17
Diseases due to disorders of nutrition or of metabolism	2	..	0·03	0·8	..	0·01
Diseases of the generative system	3	..	0·09	1·3	..	0·04
Diseases of Bones, Joints, Muscles, Fasciæ and Bursæ	29	..	0·78	12·3	..	0·33
Diseases of the areolar tissue	90	..	2·77	38·2	..	1·18
Diseases of the skin	19	..	0·74	8·1	..	0·31
Diseases of the urinary organs	14	..	0·43	5·9	..	0·18
Injuries — General	3	..	0·07	1·3	..	0·03
Injuries — Local	145	2	4·62	61·6	0·85	1·96
Injuries — In action	..	..	..	..	..	..
Tumours and cysts	2	..	0·06	0·8	..	0·03
Malformations	..	..	..	..	..	..
Poisons	..	..	..	..	..	..
Parasites	1	..	0·08	0·4	..	0·03
No appreciable disease	6	..	0·10	2·5	..	0·04
*Suicides	..	(1)	..	..	(0·42)	..
Total	1,031	15	33·91	437·8	6·37	14·40

*The figures against "suicides" having already been shown under the heading of the injury, etc., which caused death, are not included in the total.

TABLE IX.

WIVES OF WARRANT OFFICERS, N. C. Os. AND MEN.

INDIA.

Table showing the Average Strength, Admissions into Hospital, Deaths and Constantly Sick, during the year 1933, with Ratios per 1,000 of the Strength.

Diseases.	Admissions.	Deaths.	Average number constantly sick.	Ratio per 1,000. Admissions.	Deaths.	Constantly sick.
Average strength 4,368						
Specific diseases due to infection or infestation.						
Cholera	...	...	...	...	...	...
Dengue	28	...	0·52	6·4	...	0·12
Diphtheria	3	...	0·18	0·7	...	0·04
Dysentery bacillary	17	...	0·40	3·9	...	0·09
,, exudate	13	...	0·59	3·0	...	0·14
,, amœbic	3	...	0·14	0·7	...	0·03
,, clinical	4	...	0·11	0·9	...	0·03
Enteric fever (inclusive of typhoid, para. A, B and enteric group).	7	...	0·77	1·6	...	0·18
Erysipelas	2	...	0·07	0·5	..	0·02
Influenza	17	...	0·49	3·9	...	0·11
Malaria	152	...	3·69	34·8	...	0·84
Measles	...	...	...	...	...	...
Meningococcal infection (cerebro-spinal fever)	1	1	0·02	0·2	0·23	0·00
Mumps	...	...	...	...	...	...
Plague	...	...	...	...	...	...
Pneumonia	10	1	0·49	2·3	0·23	0·11
Pyrexia of uncertain origin	...	...	...	...	...	...
Rheumatic fever	5	...	0·40	1·1	...	0·09
Sandfly fever	8	...	0·12	1·8	...	0·03
Scarlet fever.	...	...	...	...	...	...
Scabies	...	...	...	...	...	...
Small-pox	3	1	0·27	0·7	0·23	0·06
Tuberculosis — Pulmonary	6	1	0·68	1·4	0·23	0·16
Tuberculosis — Other	2	...	0·33	0·5	...	0·08
Venereal diseases — Gonorrhœa	...	...	...	...	...	...
Venereal diseases — Soft chancre	...	...	...	...	...	...
Venereal diseases — Syphilis	1	...	0·37	0·2	...	0·08
Venereal diseases — Other V. D.	...	...	...	...	...	...

Typhus fever	...	...	...	...	...	...
Other diseases due to infection or infestation	26	...	0·86	6·0	...	0·20
Other diseases classified under systems.						
Diseases of the nervous system	28	...	0·91	6·4	...	0·21
Mental diseases	19	...	1·50	4·3	...	0·34
Diseases of the eye	3	...	0·08	0·7	...	0·02
Diseases of the ear and nose	31	...	0·89	7·1	...	0·20
Diseses of the Circulatory system. — Valvular diseases of the heart	5	...	0·25	1·1	...	0·06
Diseses of the Circulatory system. — Disordered action of the heart	12	2	0·35	2·7	0·46	0·08
Diseses of the Circulatory system. — Other diseases	12	...	0·61	2·7	...	0·14
Diseases associated with abnormalities of the blood	8	...	0·22	1·8	...	0·05
Diseases of the spleen	...	...	0·22	...	...	0·05
Diseases of the lymphatic system	3	...	0·06	0·7	...	0·01
Diseases of Ductless or endocrine glands	9	...	0·42	2·1	...	0·10
Diseases of the breast	16	...	0·58	3·7	...	0·13
Diseases of the Respiratory system. — Larynx and trachea	1	...	0·01	0·2	...	0·00
Diseases of the Respiratory system. — Bronchi and bronchioles	42	...	1·33	9·6	...	0·30
Diseases of the Respiratory system. — Lung, other than tuberculosis and pneumonia.	1	...	0·01	0·2	...	0·00
Diseases of the Respiratory system. — Other diseases	6	...	0·15	1·4	...	0·03
Diseases of the teeth and gums	21	...	0·33	4·8	...	0·08
Diseases of the Digestive System. — Inflammation of tonsils	69	...	1·25	15·8	...	0·29
Diseases of the Digestive System. — Liver diseases	9	...	0·43	2·1	...	0·10
Diseases of the Digestive System. — Other diseases	225	...	6·87	51·5	...	1·57
Diseases due to disorders of nutrition or of metabolism	4	1	0·15	0·9	0·23	0·03
Diseases of the generative system	343	4	11·27	78·5	0·92	2·58
Diseases of Bones, Joints, Muscles, Fasciae and Bursae	28	...	1·18	6·4	...	0·26
Diseases of the areolar tissue	33	...	1·11	7·6	...	0·25
Diseases of the skin	7	...	0·18	1·6	...	0·04
Diseases of the urinary organs	69	...	3·30	15·8	...	0·76
Injuries — General	...	...	...	...	...	...
Injuries — Local	14	1	1·07	3·2	0·23	0·24
Injuries — In action	...	...	...	...	...	...
Tumours and cysts	13	2	0·63	3·0	0·46	0·14
Malformations	2	...	0·09	0·5	...	0·02
Poisons	...	...	...	...	...	...
Parasites	...	...	...	...	...	...
No appreciable disease	27	...	0·47	6·2	...	0·11
Suicides	...	(1)	...	...	(0·23)	...
Total	1,368	14	46·37	313·2	3·21	10·62

The figures against "suicides" having already been shown under the heading of the injury, etc., which caused death, are not included in the total.

TABLE XI.

CHILDREN OF WARRANT OFFICERS, N. C. Os. AND MEN.

INDIA.

Table showing the Average Strength, Admissions into Hospital, Deaths, and Constantly Sick, during the year 1933, with Ratios per 1,000 of the Strength.

Diseases.	Admissions.	Deaths.	Average number constantly sick.	Ratio per 1,000. Admissions.	Deaths.	Constantly sick.
Average strength 6,694						
Specific Diseases due to infection or infestation.						
Cholera	..	..	..	..	..	..
Dengue	16	..	0·31	2·4	..	0·05
Diphtheria	37	4	3·39	5·5	0·60	0·51
Dysentery Bacillary	73	2	2·78	10·9	0·30	0·42
,, exudate	54	1	1·96	8·1	0·15	0·29
,, amœbic	6	..	0·38	0·9	..	0·06
,, clinical	16	1	0·43	2·4	0·15	0·06
Enteric fever (inclusive of typhoid, para. A, B and enteric group).	10	..	1·70	1·5	..	0·25
Erysipelas	2	1	0·19	0·3	0·15	0·03
Influenza	30	..	0·75	4·5	..	0·11
Malaria	170	1	3·91	25·4	0·15	0·58
Measles	25	..	0·88	3·7	..	0·13
Meningococcca linfection (cerebro-spinal fever)	..	..	..	..	..	..
Mumps	8	..	0·29	1·	..	0·04
Plague	..	..	..	..	..	..
Pneumonia	45	3	2·34	6·7	0·45	0·35
Pyrexia of uncertain origin	1	..	0·07	0·1	..	0·01
Rheumatic fever	5	..	0·62	0·7	..	0·09
Sandfly fever	20	..	0·31	3·0	..	0·05
Scabies	..	..	..	..	..	..
Scarlet fever	7	..	0·87	1·0	..	0·13
Small pox	4	..	0·36	0·6	..	0·05
Tuberculosis { Pulmonary	1	..	0·07	0·1	..	0·01
Tuberculosis { Other	1		0 61	0·1	0·30	0·00

Venereal diseases. Gonorrhœa	2	..	0·26	0·3	..	0·04
Soft chancre	..	..	..	..	..	..
Syphilis	..	..	..	..	..	..
Other V. D.	..	..	..	..	..	..
Typhus fever	3	..	0·22	0·4	..	0·03
Other diseases due to infection or infestation	76	3	1·79	11·4	0·45	0·27
Other Diseases classified under systems.						
Diseases of the nervous system	22	7	0·48	3·9	1·05	0·07
Mental diseases	..	..	..	..	..	..
Diseases of the eye	33	..	0·99	4·9	..	0·15
Diseases of the ear and nose	52	..	1·14	7·8	..	0·17
Diseases of the Circulatory system. Valvular diseases of the heart	2	1	0·20	0·3	0·15	0·03
Disordered action of the heart	3	1	0·05	0·4	0·15	0·01
Other diseases	1	1	0·00	0·1	0·15	0·00
Diseases associated with abnormalities of the blood	2	1	0·18	0·3	0·15	0·03
Diseases of the spleen	..	..	..	..	..	..
Diseases of the lymphatic system	33	..	1·11	4·9	..	0·17
Diseases of Ductless or endocrine glands	..	..	..	..	..	..
Diseases of the breast	..	..	..	..	..	..
Diseases of the Respiratory system. Larynx and trachea	5	..	0·09	0·7	..	0·01
Bronchi and bronchioles	135	2	2·94	20·2	0·30	0·44
Lung, other than tuberculosis and pneumonia.	1	1	0·00	0·1	0·15	0 00
Other diseases	3	..	0·46	0·4	..	0·07
Diseases of the teeth and gums	17	..	0·32	2·5	..	0·05
Diseases of the Digestive system. Inflammation of tonsils	194	..	3·79	29·0	..	0·57
Liver diseases	16	2	0·48	2·4	0·30	0·07
Other diseases	405	17	9·59	60·5	2·54	1·43
Diseases due to disorders of nutrition or of metabolism	71	7	2·70	10·6	1·05	0·40
Diseases of the generative system	31	9	0·64	4·6	1·34	0·10
Diseases of Bones, Joints, Muscles, Fasciæ and Bursæ	6	..	0·12	0·9	..	0·02
Diseases of the areolar tissue	93	1	2·85	13·9	0·15	0·43
Diseases of the skin	14	..	0·47	2·1	..	0·07
Diseases of the urinary organs	17	..	1·16	2·5	..	0·17
Injuries . . General	1	..	0·02	0.1	..	0·00
Local	88	3	3·23	13·1	0·45	0·48
In action	..	..	..	..	..	..
Tumours and cysts	1	..	0·02	0·1	..	0·00
Malformations	5	3	0·15	0·7	0·45	0·02
Poisons	..	..	..	..	..	..
Parasites	..	..	..	..	..	..
No appreciable disease	*24	..	0·74	3·6	..	0·11
Suicides	..	..	..	..	..	..
Total	1,887	74	57·81	281·9	11·05	8·64

* Includes figures for carriers.

TABLE XII.

BRITISH OTHER RANKS.

Table showing admission and death ratios per 1,000 of Strength by Commands contrasted with the previous year, and the average for the previous five years.

Commands.	Enteric group of fevers.		Influenza.		Cholera.		Small-pox.		Malaria.		Dysentery.	
	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.
Northern Command	3·5	0·23	17·3	..	..	..	0·2	..	159·8	0·06	21·3	..
	4·8	0·28	29·3	..	..	..	0·2	..	91·7	0·17	21·5	..
	5·5	0·43	20·8	..	0·0	0·01	0·1	..	147·8	0·09	20·3	0.01
Western Command	1·9	..	41·4	..	..	..	..	..	204·0	..	40·4	..
	3·7	0·25	44·1	..	..	..	..	..	131·1	0·49	46·8	..
	4·6	0·15	19·8	0·15	..	..	0·1	..	134·9	0·10	24·4	..
Eastern Command	5·2	0·56	29·1	0·12	..	..	0·7	..	62·6	..	23·9	0·06
	2·9	0·25	11·7	..	..	..	..	..	89·5	0·06	24·2	..
	3·0	0·26	11·1	..	0·1	0·02	0·0	..	78·5	0·07	19·8	0·04
Southern Command	1·1	0·07	12·0	0·07	..	..	0·1	..	60·6	0·13	26·7	..
	2·5	0·32	7·5	..	..	..	0·1	..	62·4	0·06	25·8	..
	2·1	0·16	9·1	..	0·0	..	0·0	..	82·2	0·06	26·3	0·01
Burma District	1·1	..	8·3	..	..	..	..	..	39·8	..	20·0	..
	0·6	..	19·9	..	..	..	..	..	46·3	..	11·0	..
	1·6	0·11	17·6	..	..	..	..	..	46·6	0·11	18·0	..
All-India	3·1	0·25	20·8	0·05	..	..	0·3	..	103·3	0·05	25·0	0·02
	3·4	0·27	18·8	0·04	..	..	0·1	..	84·1	0·13	25·0	..
	3·6	0·27	14·3	0·01	0·0	0·01	0·1	..	104·0	0·10	21·8	0·02

Commands.	Pyrexia of uncertain origin.		Pneumonia lobar and lobular.		Venereal diseases.		Dengue.		Sandfly fever.		Plague.	
	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.
Northern Command	0·9	..	4·0	0·23	27·2	..	0·3	..	85·9	..	..	..
	3·4	..	6·6	0·85	27·2	..	0·5	..	81·7	..	..	..
	1·8	..	4·9	0·51	31·7	..	0·8	..	89·6	..	..	..
Western Command	..	..	2·7	0·48	25·0	..	3·6	..	2·7	..	..	..
	0·7	..	3·4	0·74	30·0	..	11·6	..	6·7	..	..	..
	2·1	..	3·9	0·54	36·2	..	2·9	..	13·6	..	..	..
Eastern Command	0·3	..	4·4	0·19	37·7	..	7·3	..	28·9	..	..	..
	0·4	..	4·4	0·31	43·5	..	13·0	..	23·6	..	..	..
	0·9	..	3·7	0·39	46·9	..	16·2	..	24·0	..	0.0	..
Southern Command	2·6	..	2·8	0·39	32·7	..	15·9	..	15·9	..	..	..
	2·0	..	3·0	0·19	37·6	..	8·7	..	23·1	..	..	..
	2·2	..	2·9	0·24	44·1	0.01	10·6	..	20·7	..	..	..
Burma District	..	..	1·7	..	78·1	..	146·1	..	7·2	..	..	..
	2·8	..	2·8	0·55	107·1	..	16·5	..	0·6	..	..	..
	1·0	..	2·9	0·22	118·4	..	72·7	..	1·4	..	0·1	0·11
All-India	1·1	..	3·6	0.27	33·4	..	11·7	..	40·9	..	..	..
		..	4·6	0·49	37·8	..	7·8	..	40·9	..	..	..
	1·7	..	3·8	0·39	42·7	0·00	10·7	..	41·8	..	0·0	0·00

A.—Admissions D.—Deaths.

NOTE.—The three figure opposite each command are those for (1) 1933, (2) 1932 and (3) 1928-32.

TABLE XIII.

VACCINATION PERFORMED IN THE BRITISH AND INDIAN ARMIES DURING 1933—OFFICERS AND OTHER RANKS.

Commands.	British Troops.							
	Officers.				Warrant N. C. Os, officers and men.			
	Number.		Percentage of successful cases to total operations.		Number.		Percentage of successful cases to total operations.	
	P.	R.	P.	R.	P.	R.	P.	R.
Northern	..	394	..	81	133	8,627	98	80
Western	2	70	100	93	81	575	90	88
Eastern	..	305	..	72	1	7,199	100	67
Southern	..	221	..	66	3	4,392	100	61
Burma District	..	2	..	100	..	453	..	78
Total	2	992	100	76	218	21,246	95	72

Commands.	Indian Troops.									
	European officers.				Indian commissioned, Non-commissioned officers and men.				Followers.			
	Number.		Percentage of successful cases to total operations.		Number.		Percentage of successful cases total operations.		Number.		Percentage of successful cases to total operations.	
	P.	R.	P.	R.	P.	R.	P.	R.	P.	R.	P.	R.
Northern	..	388	..	92	170	30,326	93	84	35	9,445	100	87
Western	..	58	..	60	26	3,312	77	84	1	635	100	89
Eastern	..	169	..	89	759	15,065	74	54	40	3,300	77	55
Southern	1	164	100	76	316	11,024	85	61	22	3,519	27	64
Burma District	..	3	..	66	..	620	..	80	..	86	..	63
Total	1	782	100	75	1,271	60,347	79	72	98	16,985	74	76

P.—Primary.

R.—Revaccinations.

TABLE XIV.

VACCINATION PERFORMED IN THE FAMILIES—BRITISH ARMY DURING 1933.

Commands.	Women.				Children.			
	Number.		Percentage of successful cases to total operations.		Number.		Percentage of successful cases to total operations.	
	P.	R.	P.	R.	P.	R.	P.	R.
Northern	25	800	100	76	235	949	98	80
Western	1	118	..	88	68	98	90	91
Eastern	5	592	20	80	199	709	89	74
Southern	..	524	..	79	183	748	82	84
Burma District	..	16	..	87	32	28	91	89
Total	31	2,050	84	79	717	2,532	90	80

TABLE—XV.

VACCINATION PERFORMED IN THE FAMILIES—BRITISH ARMY DURING 1933.

Commands.	Women.				Children.			
	Number.		Percentage of successful cases to total operations.		Number.		Percentage of successful cases to total operations.	
	P.	R.	P.	R.	P.	R.	P.	R.
Northern	..	201	..	91	28	118	100	86
Western	..	38	..	58	8	31	100	84
Eastern	1	175	100	74	38	196	92	65
Southern	..	96	..	78	7	51	100	75
Burma District	..	3	..	100	..	9	..	11
Total	1	513	100	80	81	404	96	73

SECTION II.

INDIAN ARMY, 1933.

TABLE B.

STATIONS BY COMMANDS AND INDEPENDENT DISTRICTS.

Stations.	Height above M. S. level in feet.*	Authority for height.	Points of reference.
Northern Command.			
Abbottabad	4,010	S. D.	Map.
Ambala	902	,,	S.B.M.
Amritsar	754	,,	,,
Bakloh	4,585	,,	Map.
Bannu	1,250	,,	,,
Campbellpore	1,180	,,	,,
Chakdara	2,358	,,	,,
Cherat and Chappri	4,546	,,	,,
Chitral	4,980	,,	,,
Dagshai	6,087	,,	,,
Dalhousie	7,687	,,	,,
Dargai	1,540	,,	,,
Dera Ismail Khan	568	,,	S.B.M.
Dharamsala Cantt.	4,500	,,	Map.
Drosh Fort	4,340	,,	,,
Ferozepore	649	,,	S.B.M.
Hangu	2,708	,,	Map.
Jhelum	762	,,	S.B.M.
Jullundur Cantt.	771	,,	B.M.
Jutogh	6,370	,,	Map.
Kalabagh and Baragali	7,963	,,	,,
Kalabagh and Mari Indus	682	,,	,,
Khyragali	7,678	,,	,,
Kohat	1,725	,,	,,
Kuldana	7,049	S. G.	,,
Lahore Cantonment	706	S.D.	S.B.M.
Landikotal	3,509	,,	Map.
Lockart Fort	6,613	,,	,,
Malakand	2,740	,,	,,
Manzai	1,650	,,	,,
Mardan	1,000	,,	,,
Mir Ali	..	..	..
Mona	3,500	S.D.	Map.
Multan	404	,,	S.B.M.
Nowshera (Ry. Station)	966	,,	B.M.
Peshawar	1,152	,,	S.B.M.
Rawalpindi	1,689	,,	,,
Razmak	6,556	,,	Map.
Risalpur	1,014	,,	B.M.
Sargodha (Railway Rest House)	615	,,	,,
Sialkot	829	,,	,,
Solon	5,078	,,	,,
Subathu	4,000	,,	Map.
Thall	2,450	,,	,,
Wana	..	..	..
Shagai	3,174	..	B.M.
Western Command.			
Chaman Fort	5,502	S.D	Map.
Fort Sandeman	4,600	,,	,,
Hindubagh	5,821	,,	,,
Hyderabad (Sind)	96	,,	S.B.M.
Karachi (Holy Trinity Church)	28	,,	,,
Loralai	4,699	,,	Map.
Quetta	5,510	,,	S.B.M.
Eastern Command.			
Agra (Fort)	525	S.D.	S.B.M.
Alipore	17	,,	B.M.
Allahabad	314	S.D.	S.B.M.
Almora	5,494	,,	Map.
Bankura	..	..	..
Bareilly	563	S.D.	S.B.M.
Benares	256	,,	,,
Cawnpore	407	,,	B.M.
Comilla	..	..	..
Dacca	20	M.D.	..
Dehra Dun	2,232	S.D.	S.B.M.
Delhi	757	,,	S.B.M.
Dinapore	170	,,	Church.
Fategarh	467	,,	,,
Fyzabad	330	,,	S.B.M.
Ghoom	7,313	,,	Jn. of road.
Gyantse	13,120	,,	Map.
Gorakhpore	..	..	..
Jhansi	849	S.D.	S.B.M.
Lansdowne	5,823	,,	Map.
Lucknow	383	,,	B.M.
Meerut	737	,,	S.B.M.
Midnapore	..	..	..
Muttra	560	S.D.	S.B.M.
Mymensingh	..	..	..
Nowgong	735	S.D.	B.M.
Roorkee	879	,,	S.B.M.
Saidpur	..	..	..
Shillong	4,921	S.D.	Map.
Southern Command.			
Ahmedabad	162	S.D.	S.B.M.
Ahmednagar	2,180	,,	Map.
Aurangabad	1,905	M.D.	,,
Bangalore	3,002	S.D.	S.B.M.
Baroda	114	,,	B.M.
Belgaum	2,523	,,	S.B.M.
Bombay (town hall)	20	,,	,,
Cannanore	40	,,	..
Deolali	1,894	,,	S.B.M.
Jubbulpore	1,320	,,	,,
Kamptee (Rly. Station).	940	,,	B.M.
Mhow (Ry. Station)	1,887	,,	,,
Mount Abu (Sanitorium)	3,836	,,	..
Neemuch	1,613	,,	..
Nasirabad	1,461	,,	B.M.
Pachmarhi	3,490	,,	,,
Poona	1,867	,,	S.B.M.
Saugor.	1,755	,,	,,
St. Thos. Mount (Ry. Station)	34	,,	B.M.
Madras (Obsy.)	250	,,	,,
Trichinopoly	256	,,	S.B.M.
Trimulgherry	1,843	,,	Map.
Wellington Stn. Hospl.	5,800	,,	,,
Burma District.			
Mandalay (Fort Dufferin)	246	S.D.	Map.
Maymyo	3,508	,,	,,
Mingaladon	118	,,	,,

* These heights are those of the survey-marks or of the mercury surface in barometer cisterns of meteorological observatories.

S. D. = Survey Department (Map Publication Office).
S. G. = Surveyor-General of India.
S.B.M. = Standard Bench Mark.
B.M. = G. T. Bench Mark.
Map. = Heights taken from Topo. Maps.
M.D.—Meteorological Department.

TABLE XVI.

INDIAN OFFICERS AND INDIAN OTHER RANKS.

ALL INDIA.

Table showing the average strength, admissions into hospital, deaths, numbers invalided and constantly sick, during the year 1933, with ratios per 1,000 of the strength.

Diseases.	Average strength.	Admissions.	Deaths.	Invalids.	Average number constantly sick.	Ratio per 1,000. Admissions.	Deaths.	Invalids.	Constantly sick.
	117,561.								
Specific diseases due to infection or infestation.									
Cholera		..	..	..	..	..	..	..	0·05
Dengue		244	..	..	5·47	2·1	..	..	0·01
Diphtheria		14	1	1	0·77	0·1	0·01	0·01	
Dysentery bacillary		727	1		27·45	6·2	0·01	..	0·23
,, ,, exudate		570	..	..	22·40	4·8	..	..	0·19
,, amoebic		96	..	..	6·90	0·8	..	..	0·06
,, clinical		411	1	..	14·21	3·5	0·01	..	0·12
Enteric fever (inclusive of typhoid, para A B & C and enteric group).		244	23	..	31·68	2·1	0·20	..	0·27
Erysipelas		5	..	..	0·17	0·0	..	..	0·00
Influenza		1,293	..	..	29·84	11·0	..	..	0·25
Malaria		24,945	7	6	511·55	212·2	0·06	0·05	4·35
Measles		174	4	..	8·70	1·5	0·03	..	0·07
Meningococcal infection (cerebro-spinal fever).		26	15	..	2·05	0·2	0·13	..	0·02
Mumps		660	..	..	34·08	5·6	..	..	0·29
Plague		7	6	..	0·19	0·1	0·05	..	0·00
Pneumonia		730	89	1	57·64	6·2	0·76	0·01	0·49
Pyrexia of uncertain origin		12	1	..	2·31	0·1	0·01	..	0·02
Rheumatic fever		99	1	5	7·27	0·8	0·01	0·04	0·06
Sandfly fever		1,227	..	..	24·31	10·4	..	..	0·21
Scabies		1,032	..	..	32·98	8·8	..	..	0·28
Scarlet fever		4	..	..	0·45	0·0	..	..	0·00
Small-pox		43	8	..	3·13	0·4	0·03	..	0·08

TABLE XVI—*contd.*

Diseases.	Admissions.	Deaths.	Invalids.	Average number constantly sick.	Ratio, per 1,000. Admissions.	Deaths.	Invalids.	Constantly sick.
Tuberculosis — Pulmonary	203	13	187	18·64	1·7	0·11	1·59	0·16
Tuberculosis — Other	50	3	33	9·37	0·4	0·03	0·28	0·08
Venereal diseases — Gonorrhœa	557	..	3	61·87	4·7	..	0·03	0·53
Venereal diseases — Soft chancre	257	..	..	27·75	2·2	..	..	0·24
Venereal diseases — Syphilis	455	1	4	46·45	3·9	0·01	0·03	0·40
Venereal diseases — Other V.D.	6	..	1	0·72	0·1	..	0·01	0·01
Typhus fever	19	1	..	1·69	0·2	0·01	..	0·01
Other diseases due to infection or infestation	1,357	12	14	72·54	11·5	0·10	0·12	0·62
Other diseases classified under systems.								
Diseases of the nervous system	366	9	35	18·24	3·1	0·08	0·30	0·16
Mental diseases	102	..	34	3·15	0·9	..	0·29	0·07
Diseases of the eye	1,217	..	43	49·73	10·4	..	0·37	0·42
Diseases of the ear and nose	1,382	2	16	34·42	11·8	0·02	0·14	0·29
Diseases of the Circulatory system — Valvular diseases of the heart	17	1	12	1·59	0·1	0·01	0·10	0·01
Diseases of the Circulatory system — Disordered action of the heart	34	5	3	2·16	0·3	0·04	0·03	0·02
Diseases of the Circulatory system — Other diseases	48	8	4	3·42	0·4	0·07	0·03	0·03
Diseases associated with abnormalities of the blood	150	1	3	9·92	1·3	0·01	0·03	0·08
Diseases of the spleen	42	1	3	1·39	0·4	0·01	0·03	0·01
Diseases of the lymphatic system	179	1	6	11·75	1·5	0·01	0·05	0·10
Diseases of ductless or endocrine glands	8	..	1	0·41	0·1	..	0·01	0·00
Diseases of the breast	4	..	..	0·11	0·0	..	..	0·00
Diseases of the Respiratory system — Larynx and trachea	109	1	..	2·65	0·9	0·01	..	0·02
Diseases of the Respiratory system — Bronchi & bronchioles	1,663	3	17	58·81	14·1	0·03	0·14	0·50
Diseases of the Respiratory system — Lung, other than tuberculosis and pneumonia.	15	..	..	0·70	0·1	..	..	0·01
Diseases of the Respiratory system — Other diseases	224	3	13	19·13	1·9	0·03	0·11	0·16
Diseases of the teeth and gums	258	..	3	6·03	2·2	..	0·03	0·05
Diseases of the Digestive system — Inflammation of tonsils	707	..	..	16·71	6·0	..	..	0·14
Diseases of the Digestive system — Liver diseases	444	3	3	25·86	3·8	0·03	0·03	0·23
Diseases of the Digestive system — Other diseases	511	5	20	131·95	43·4	0·04	0·17	1·12
Diseases due to disorders of nutrition or of metabolism	17	..	2	1·89	0·1	..	0·02	0·02
Diseases of the generative system	279	..	3	13·41	2·4	..	0·03	0·11
Diseases of Bones, Joints, Muscles, Fasciae and Bursae	1,172	1	54	57·17	10·0	0·01	0·46	0·49
Diseases of the areolar tissue	8,595	1	2	131·45	30·6	0·01	0·02	1·12
Diseases of the skin	1,276	..	5	53·85	10·9	..	0·04	0·45
Diseases of the urinary organs	228	6	19	12·68	1·9	0·05	0·16	0·11

Injuries — General	78	15	..	1·58	0·7	0·13	..	0·01
Injuries — Local	5,668	26	107	263·92	48·2	0·22	0·91	2·24
Injuries — In action	..	..	..	..	..	..	..	..
Tumours and cysts	134	1	3	6·51	1·1	0·01	0·03	0·06
Malformations	4	..	2	0·37	0·0	..	0·02	0·00
Poisons	25	5	..	0·93	0·2	0·04	..	0·01
Parasites	..	..	..	..	..	..	..	..
No appreciable diseases	50	..	..	2·43	0·4	..	..	0·02
Other causes	..	1	..	..	..	0·01	..	..
Suicides*	(1)	(4)	(1)	(0·03)	(0·0)	(0·03)	(0·01)	(0·00)
Total	60,063	281	668	2,011·00	510·9	2·39	5·68	17 11

* The figures against "Suicides" having already been shown under the heading of the injury, etc., which caused death, are not included in the total.

TABLE XVII.

INDIAN OFFICERS AND INDIAN OTHER RANKS.

NORTHERN COMMAND.

Table showing the average strength, admissions into hospital, deaths, numbers invalided and constantly sick, during the year 1933, with ratios per 1,000 of the strength.

Diseases. Average strength, 56,076.	Admissions.	Deaths.	Invalids.	Average number constantly sick.	Ratio per 1,000. Admissions.	Deaths.	Invalids.	Constantly
Specific Diseases due to infection or infestation.								
Cholera	...	...	...	...	...	...	...	...
Dengue	...	...	...	.....	...	...	...	...
Diphtheria	1	...	...	0·05	0·0	...	...	0·00
Dysentery bacillary	334	...	...	11·90	6·0	...	...	0·21
,, ,, exudate	254	...	...	9·60	4·5	...	...	0·17
,, amœbic	23	...	...	1·57	0·4	...	...	0·08
,, clinical	230	1	...	8·28	4·1	0·02	...	0·15

TABLE XVII—*contd.*

Diseases. Average strength, 56,076.	Admissions.	Deaths.	Invalids.	Average number constantly sick.	Ratio per 1,000. Admissions.	Deaths.	Invalids.	Constantly sick.
Specific Diseases due to infection or infestation—contd.								
Enteric fever (inclusive of typhoid, para A, B & C, and enteric group).	126	12	...	17·23	2·2	0·21	...	0·31
Erysipelas	1	...	...	0·02	0·0	...	...	0·00
Influenza	557	...	...	12·08	9·9	...	...	0·22
Malaria	15,807	4	3	320·07	281·9	0·07	0·05	5·71
Measles	85	3	...	4·29	1·5	0·05	...	0·06
Meningococcal infection (cerebro-spinal fever)	13	9	...	1·26	0·2	0·16	...	0·02
Mumps	382	...	...	19·24	6·8	...	...	0·34
Plague	...	1	...	...	...	0·02	...	...
Pneumonia	433	49	...	33·65	7·7	0·87	...	0·60
Pyrexia of uncertain origin	1	...	...	0·17	0·0	...	...	0·00
Rheumatic fever	50	1	5	3·58	0·9	0·02	0·09	0·06
Sandfly fever	925	...	...	18·25	16·5	...	...	0·33
Scabies	384	...	...	12·92	6·8	...	...	0·23
Scarlet fever.	...	...	...	...	...	...	...	...
Small-pox	25	2	...	2·00	0·4	0·04	...	0·04
Tuberculosis — Pulmonary	113	10	99	10·60	2·0	0·18	1·77	0·19
Tuberculosis — Other	24	1	17	4·63	0·4	0·02	0·30	0·08
Venereal diseases — Gonorrhoea	212	...	2	24·21	3·8	...	0·04	0·4
Venereal diseases — Soft chancre	86	...	...	9·27	1·5	...	...	0·15
Venereal diseases — Syphilis	158	1	3	18·08	2·8	0·02	0·05	0·32
Venereal diseases — Other V. D.	...	...	...	...	...	...	...	...
Typhus fever	1	...	...	0·06	0·0	...	...	0·00
Other diseases due to infection or infestation	550	5	6	28·62	9·8	0·09	0·11	0·51
Other Diseases classified under systems.								
Diseases of the nervous system	168	6	18	9·12	3·0	0·11	0·32	0·16
Mental diseases	39	...	8	3·00	0·7	...	0·14	0·05
Diseases of the eye	611	...	20	25·67	10·9	...	0·36	0·46
Diseases of the ear and nose	668	...	7	18·02	11·9	...	0·12	0·32

Diseases of the Circulatory system.	Valvular diseases of the heart	7	1	5	0·53	1·2	0·02	0·09	0·01
	Disordered action of the heart	7	2	1	0·52	1·2	0·04	0·02	0·01
	Other diseases	28	2	4	2·14	0·5	0·04	0·07	0·04
Diseases associated with abnormalities of the blood		57	...	1	3·81	1·0	...	0·02	0·07
Diseases of the spleen		31	1	1	0·88	0·5	0·02	0·02	0·02
Diseases of the lymphatic system		75	1	2	4·59	1·3	0·02	0·04	0·08
Diseases of ductless or endocrine glands		4	...	...	0·26	0·1	...	...	0·00
Diseases of the breast		2	...	...	0·05	0·0	...	...	0·00
Diseases of the Respiratory system.	Larynx and trachea	34	...	...	0·80	0·6	...	...	0·01
	Bronchi and bronchioles	689	1	5	24·12	12·3	0·02	0·09	0·43
	Lung, other than tuberculosis and pneumonia.	14	...	...	0·66	0·2	...	...	0·01
	Other diseases	106	3	7	9·87	1·9	0·05	0·12	0·18
Diseases of the teeth and gums		113	...	1	2·63	2·0	...	0·02	0·05
Diseases of the Digestive system.	Inflammation of tonsils	287	...	...	7·18	5·1	...	...	0·13
	Liver diseases	203	1	1	11·17	3·6	0·02	0·02	0·20
	Other diseases	2,591	2	6	61·52	46·2	0·04	0·11	1·10
Diseases due to disorders of nutrition or of metabolism		5	...	1	0·25	0·1	...	0·02	0·00
Diseases of the generative system		97	...	2	5·33	1·7	...	0·04	0·10
Diseases of Bones, Joints, Muscles, Fasciae and Bursae		582	...	18	27·65	10·4	...	0·32	0·49
Diseases of the areolar tissue		1,862	1	2	64·57	33·2	0·02	0·04	1·15
Diseases of the skin		612	...	1	24·51	10·9	...	0·02	0·44
Diseases of the urinary organs		103	...	9	6·05	1·8	...	0·16	0·11
Injuries	General	53	9	...	0·93	0·9	0·16	...	0·02
	Local	2,905	14	51	138·70	51·8	0·25	0·91	2·47
	In action	...	...	...	...	...	...	...	...
Tumours and cysts		66	...	1	3·06	1·2	...	0·02	0·05
Malformations		2	...	1	0·30	0·0	...	0·02	0·01
Poisons		0	3	...	0·39	0·2	0·05	...	0·01
Parasites		...	...	...	...	...	...	...	...
No appreciable disease		14	...	...	0·59	·02	...	...	0·01
Other causes		...	1	...	...	...	0·02	...	...
Suicides*		...	2	...	...	...	0·04	...	...
TOTAL.		32,820	147	308	1029·46	585 3	2·62	5·49	18·36

*The figures against "Suicides" having already been shown under the heading of the injury, etc., which caused death, are not included in the total.

TABLE XVIII.

INDIAN OFFICERS AND INDIAN OTHER RANKS.

WESTERN COMMAND.

Table showing the average strength, admissions into hospital, deaths, numbers invalided and constantly sick, during the year 1933, with ratios per 1,000 of the strength.

Diseases. Average strength 13,214.	Admissions.	Deaths.	Invalids.	Average number constantly sick.	Ratio per 1,000. Admissions.	Deaths.	Invalids.	Constantly sick.
Specific Diseases due to infection or infestation.								
Cholera	..	..	..	..	..	..	..	..
Dengue	1	..	..	0·07	0·1	..	..	0·01
Diphtheria	..	1	..	0·01	..	0·08	..	0·00
Dysentery bacillary	146	..	..	5·49	11·0	..	..	0·42
Dysentery bacillary exudate	104	..	..	3·27	7·9	..	..	0·25
Dysentery amœbic	22	..	..	1·82	1·7	..	..	0·14
Dysentery clinical	84	..	..	2·80	6·4	..	..	21.2
Enteric fever (inclusive of typhoid, para. A, B & C, and enteric group)	31	3	..	3·92	2·3	0·23	..	0·30
Erysipelas	2	..	..	0·04	0·2	..	..	0·00
Influenza	98	..	..	2·85	7·4	..	..	0·22
Malaria	3,739	1	3	74·93	283·0	0·08	0·23	5·67
Measles	51	..	..	2·61	3·9	..	..	0·20
Meningococcal infection (cerebro-spinal fever)	1	..	..	0·07	0·1	..	..	0·01
Mumps	34	..	..	1·78	2·6	..	..	0·13
Plague	..	..	..	..	..	..	..	..
Pneumonia	75	16	1	6·15	5·7	1·21	0·08	0·47
Pyrexia of uncertain origin	1	..	..	0·12	0·1	..	..	0·01
Rheumatic fever	9	..	..	0·74	0·7	..	..	0·06
Sand-fly fever	100	..	..	1·62	7·6	..	..	0·12
Scabies	19	..	..	0·87	1·4	..	..	0·07
Scarlet fever	..	..	..	..	..	..	..	..
Small-pox	6	..	..	0·37	0·5	..	..	0·03
Tuberculosis — Pulmonary	23	2	19	2·45	1·7	0·15	1·44	0·19
Tuberculosis — Other	10	..	8	1·30	0·8	..	0·61	0·10

Venereal diseases.	Gonorrhœa	28	..	..	3·76	2·1	..	..	0·28
	Soft chancre	21	..	..	1·76	1·6	..	..	0·13
	Syphilis	30	..	..	4·29	2·3	..	..	0·32
	Other V. D.	..	..	..	..	..	..	..	..
Typhus fever		..	..	..	..	..	..	..	..
Other diseases due to infection or infestation		182	..	1	8·71	13·8	..	0·08	0·66
Other diseases classified under systems.									
Diseases of the nervous system		28	..	..	1·03	2·1	..	..	0·08
Mental diseases		14	..	7	1·38	1·1	..	0·53	0·10
Diseases of the eye		80	..	1	2·69	6·1	..	0·08	0·20
Diseases of the ear and nose		47	..	5	1·52	3·6	..	0·38	0·12
Diseases of the Circulatory system.	Valvular diseases of the heart	2	..	1	0·27	0·2	..	0·08	0·02
	Disordered action of the heart	..	..	..	..	..	..	..	..
	Other diseases	4	..	..	0·19	0·3	..	..	0·01
Diseases associated with abnormalities of the blood		26	1	1	1·73	2·0	0·08	0·08	0·13
Diseases of the spleen		4	..	..	0·09	0·3	..	..	0·01
Diseases of the lymphatic system		16	..	..	0·77	1·2	..	..	0·06
Diseases of the ductless or endocrine glands		..	..	..	..	..	..	..	..
Diseases of the breast		..	..	..	..	..	..	..	..
Diseases of the Respiratory system.	Larynx and trachea	6	..	..	0·18	0·5	..	..	0·01
	Bronchi and bronchioles	147	1	2	5·82	11·1	0·08	0·15	0·44
	Lung, other than tuberculosis and pneumonia.	..	..	..	..	..	..	..	..
	Other diseases.	17	..	3	2·17	1·3	..	0·23	0·16
Diseases of the teeth and gums		16	..	..	0·46	1·2	..	..	0·03
Diseases of the Digestive system.	Inflammation of tonsils	89	..	..	1·98	6·7	..	..	0·15
	Liver diseases	44	1	..	2·41	3·3	0·08	..	0·18
	Other diseases	432	..	..	14·29	32·7	..	..	1·08
Diseases due to disorders of nutrition or of metabolism		1	..	..	0·00	0·1	..	..	..
Diseases of the generative system		24	..	..	1·04	1·8	..	..	0·08
Diseases of Bones, Joints, Muscles, Fasciae, and Bursae		98	..	4	5·91	7·4	..	0·30	0·45
Diseases of the areolar tissue		230	..	..	10·07	17·4	..	..	0·76
Diseases of the skin		95	..	..	3·96	7·2	..	..	0·30
Diseases of the urinary organs		20	1	2	1·14	1·5	0·08	0·15	0·09
Injuries	General	3	2	..	0·06	0·2	0·15	..	0·00
	Local	466	1	7	24·92	35·3	0·08	0·53	1·89
	In action.	..	..	..	..	..	..	..	..
Tumours and cysts		10	..	..	0·64	0·8	..	..	0·05
Malformations		..	..	..	..	..	..	..	..
Poisons		1	..	..	0·03	0·1	..	..	0·00
Parasites		..	..	..	..	..	..	..	..
No appreciable disease		14	..	..	0·89	1·1	..	..	0·07
Other cause		..	..	..	..	..	..	..	..
Suicides		..	..	..	..	..	..	..	..
	Total	6,751	30	65	217·14	510·9	2·27	4·92	16·46

TABLE XIX.

INDIAN OFFICERS AND INDIAN OTHER RANKS.

EASTERN COMMAND.

Table showing the average strength, admissions into hospital, deaths, numbers invalided and constantly sick, during the year 1933, with ratios per 1,000 of the Strength.

Diseases.	Admissions.	Deaths.	Invalids.	Average number constantly sick.	Ratio per 1,000. Admissions.	Deaths.	Invalids.	Constantly sick.
Average strength 23,829.								
Specific diseases due to infection or infestation.								
Cholera	...	...	...	...	...	...	...	...
Dengue	55	...	...	0·85	2·3	...	...	0·04
Diphtheria	13	...	...	0·59	0·5	...	...	0·02
Dysentery bacillary	104	...	...	4·80	4·4	...	...	0·20
Dysentery bacillary exudate	90	...	...	4·31	3·8	...	...	0·18
Dysentery amœbic	33	...	...	2·10	1·4	...	...	0·09
Dysentery clinical	46	...	...	1·61	1·9	...	...	0·07
Enteric fever (inclusive of typhoid, para. A, B, C and enteric group)	44	2	...	5·89	1·8	0·08	...	0·25
Erysipelas	2	...	...	0·11	0·1	...	...	0·00
Influenza	179	...	...	3·40	7·5	...	...	0·14
Malaria	2,923	1	...	65·22	122·7	0·04	...	2·74
Measles	29	1	...	1·40	1·2	0·04	...	0·06
Meningococcal infection (cerebro-spinal fever)	6	2	...	0·44	0·3	0·08	...	0·02
Mumps	178	...	...	9·42	7·3	...	...	0·40
Plague	...	...	...	...	...	...	...	...
Pneumonia	121	10	...	10·62	5·1	0·42	...	0·45
Pyrexia of uncertain origin	4	...	...	0·85	0·2	...	...	0·04
Rheumatic fever	11	...	...	0·64	0·5	...	...	0·03
Sand-fly fever	133	...	...	2·85	5·6	...	...	0·12
Scabies	265	...	...	7·99	11·1	...	...	0·34
Scarlet fever	...	...	...	...	...	...	...	...
Small-pox	7	...	...	0·51	0·3	...	...	0·02
Tuberculosis — Pulmonary	39	...	38	3·34	1·6	...	1·59	0·14
Tuberculosis — Other	8	1	5	1·88	0·3	0·04	0·21	0·08

Venereal diseases	Gonorrhœa	156	...	1	16·88	6·5	...	0·04	0·71
	Soft chancre	60	...	...	5·84	2·5	...	...	0·25
	Syphilis	115	...	...	9·14	4·8	...	...	0·38
	Other V. D.	...	...	...	...	...	...	...	...
Typhus fever		6	...	...	0·95	0·3	...	...	0·04
Other diseases due to infection or infestation		231	4	4	14·30	9·7	0·17	0·17	0·60
Other diseases classified under systems.									
Diseases of the nervous system		68	1	9	3·61	2·9	0·04	0·38	0·15
Mental diseases		30	...	10	2·40	1·3	...	0·42	0·10
Diseases of the eye		292	...	13	11·86	12·3	...	0·55	0·50
Diseases of the ear and nose		294	...	3	6·63	12·3	...	0·13	0·28
Diseases of the Circulatory system.	Valvular diseases of the heart	3	...	3	0·50	0·1	...	0·13	0·02
	Disordered action of the heart	16	1	2	0·96	0·7	0·04	0·08	0·04
	Other diseases	8	1	...	0·65	0·3	0·04	...	0·03
Diseases associated with abnormalities of the blood		29	...	...	1·90	1·2	..	..	0·08
Diseases of the spleen		4	...	1	0·17	0·2	...	0·04	0·01
Diseases of the lymphatic system		34	...	3	2·46	1·4	...	0·13	0·10
Diseases of ductless or endocrine glands		3	...	1	0·11	0·1	...	0·04	0·00
Diseases of the breast		1	...	...	0·04	0·0	...	...	0·00
Diseases of the respiratory system.	Larynx and trachea	15	...	...	0·51	0·6	...	...	0·02
	Bronchi and bronchioles.	462	1	2	15·81	19·4	0·04	0·08	0·66
	Lung other than tuberculosis and pneumonia	...	...	...	...	...	...	...	...
	Other diseases	66	...	2	4·44	2·8	...	0·08	0·19
Diseases of the teeth and gums		45	...	...	0·91	1·9	...	...	0·04
Diseases of the Digestive system.	Inflammation of tonsils	150	...	...	3·13	6·3	...	...	0·13
	Liver diseases	94	...	...	4·94	3·9	...	...	0·21
	Other diseases	999	2	3	27·86	41·9	0·08	0·13	1·17
Diseases due to disorders of nutrition or of metabolism		7	...	1	0·94	0·3	...	0·04	0·04
Diseases of the generative system		76	...	1	2·98	3·2	...	0·04	0·13
Diseases of Bones, Joints, Muscles, Fasciæ and Bursae		181	1	17	9·46	7·6	0·04	0·71	0·40
Diseases of the areolar tissue		688	...	...	25·18	28·9	...	...	1.06
Diseases of the skin		304	...	3	14·30	12·8	...	0·13	0·60
Diseases of the urinary organs		53	2	3	2·97	2·2	0·08	0·13	0·12
Injuries	General	8	2	...	0·23	0·3	0·08	...	0·01
	Local	1,223	9	24	54·19	51·3	0·38	1·01	2·27
	In action	...	...	...	...	...	...	...	...
Tumours and cysts		26	1	2	1·44	1·1	0·04	0·08	0·06
Malformations		1	...	...	0·01	0·0	...	...	0·00
Poisons		10	1	...	0·31	0·4	0·04	...	0·01
Parasites		2	...	...	0·12	0·1	...	...	0·01
No appreciable disease		7	...	...	0·20	0·3	...	...	0·01
Other causes		1	...	...	0·25	0·0	...	...	0·01
Suicides		(1)	(1)	(1)	(0·03)	(0·0)	(0·04)	(0·04)	(0·00)
	Total	10,053	43	151	377·40	421·9	1·80	6·34	15·84

The figures against "Suicides" having already been shown under the headings of the injury, etc., which caused death, are not included in the total.

TABLE XX.

INDIAN OFFICERS AND INDIAN OTHER RANKS.

SOUTHERN COMMAND.

Table showing the average strength, admissions into hospital, deaths, numbers invalided and constantly sick, during the year 1933, with ratios per 1,000 of the strength.

Diseases.	Admissions.	Deaths.	Invalids.	Average number constantly sick.	Ratio per 1,000. Admissions.	Deaths.	Invalids.	Constantly sick.
Average strength 21,441.								
Specific diseases due to infection or infesto								
Cholera	...	...	...	...	...	...	...	...
Dengue	83	...	...	2·07	3·9	...	...	0·10
Diphtheria	...	...	1	0·12	...	...	0·05	0·01
Dysentery bacillary	130	1	...	4·91	6·1	0·05	...	0·23
Dysentery bacillary exudate	118	...	...	5·04	5·5	...	...	0·24
Dysentery amœbic	15	...	...	1·20	0·7	...	...	0·06
Dysentery clinical	42	...	...	1·41	2·0	...	...	0·07
Enteric fever (inclusive of typhoid, para. A, B, C, and enteric group)	41	6	...	4·41	1·9	0·28	...	0·21
Erysipelas	...	...	...	...	...	...	...	...
Influenza	211	...	...	5·64	9·8	...	...	0·26
Malaria	2,180	1	...	42·53	101·7	0·05	...	1·98
Measles	9	...	...	0·36	0·4	...	...	0·02
Meningococcal infection (cerebro-spinal fever)	6	4	...	0·28	0·3	0·19	...	0·01
Mumps	68	...	...	3·48	3·2	...	...	0·16
Plague	7	5	...	0·19	0·3	0·23	...	0·01
Pneumonia	75	13	...	5·46	3·5	0·61	...	0·25
Pyrexia of uncertain origin	5	1	...	1·11	0·2	0·05	...	0·05
Rheumatic fever	25	...	...	1·61	1·2	...	...	0·08
Sand-fly fever	69	...	...	1·59	3·2	...	...	0·07
Scabies	254	...	...	7·98	11·8	...	...	0·37
Scarlet fever	4	...	...	0·45	0·2	...	...	0·02
Small-pox	5	1	...	0·25	0·2	0·05	...	0·01
Tuberculosis { Pulmonary	21	1	21	1·42	1·0	0·05	0·98	0·07
Tuberculosis { Other	6	...	3	0·85	0·3	...	0·14	0·04

Venereal diseases — Gonorrhœa	108	...	...	10·93	5·0	...	...	0·51
Venereal diseases — Soft chancre	71	...	...	8·63	3·3	...	...	0·40
Venereal diseases — Syphilis	94	...	1	9·52	4·4	...	0·05	0·44
Venereal diseases — Other V. D.	3	...	1	0·35	0·1	...	0·05	0·02
Typhus fever	12	1	...	0·68	0·6	0·05	...	0·03
Other diseases due to infection or infestation	301	3	3	18·32	14·0	0·14	0·14	0·85
Other diseases classified under systems.								
Diseases of the nervous system	84	1	7	3·07	3·9	0·05	0·33	0·14
Mental diseases	12	...	6	0·83	0·6	...	0·28	0·04
Diseases of the eye	206	...	8	8·04	9·6	...	0·37	0·37
Diseases of the ear and nose	325	2	1	7·30	15·2	0·09	0·05	0·34
Diseases of the circulatory system — Valvular diseases of the heart	5	...	3	0·29	0·2	...	0·14	0·01
Diseases of the circulatory system — Disordered action of the heart	8	2	...	0·42	0·4	0·09	...	0·02
Diseases of the circulatory system — Other diseases	6	4	...	0·27	0·3	0·19	...	0·01
Diseases associated with abnormalities of the blood	28	...	1	1·65	1·3	...	0·05	0·08
Diseases of the spleen	2	...	1	0·16	0·1	...	0·05	0·01
Diseases of the lymphatic system	38	...	1	2·37	1·8	...	0·05	0·11
Diseases of ductless or endocrine glands	1	...	...	0·04	0·0	...	...	0·00
Diseases of the breast	1	...	...	0·02	0·0	...	...	0·00
Diseases of the Respiratory system — Larynx and trachea	51	1	...	1·08	2·4	0·05	...	0·05
Diseases of the Respiratory system — Bronchi and bronchioles	292	...	6	9·98	13·6	...	0·28	0·46
Diseases of the Respiratory system — Lung, other than tuberculosis and pneumonia	1	...	...	0·04	0·0	...	...	0·00
Diseases of the Respiratory system — Other diseases	29	...	1	2·03	1·4	...	0·05	0·09
Diseases of the teeth and gums	75	...	2	1·74	3·5	...	0·09	0·08
Diseases of the digestive system — Inflammation of tonsils	140	...	...	3·38	6·5	...	...	0·16
Diseases of the digestive system — Liver diseases	88	1	1	5·52	4·1	0·05	0·05	0·26
Diseases of the digestive system — Other diseases	867	1	9	28·12	40·4	0·05	0·42	1·08
Diseases due to disorders of nutrition or of metabolism	3	...	...	0·57	0·1	...	...	0·03
Diseases of the generative system	64	...	...	2·56	3·0	...	...	0·12
Diseases of the Bones, Joints, Muscles, Fasciæ and Bursæ	274	...	14	12·45	12·8	...	0·65	0·58
Diseases of the areolar tissue	699	...	...	26·52	32·6	...	...	0·24
Diseases of the skin	207	...	1	8·36	9·7	...	0·05	0·39
Diseases of the urinary organs	46	3	5	2·40	2·1	0·14	0·23	0·11
Injuries — General	14	1	...	0·31	0·7	0·05	...	0·01
Injuries — Local	929	1	25	38·82	43·3	0·05	1·17	1·81
Injuries — In action	...	...	...	...	...	...	...	...
Tumours and cysts	26	...	...	1·01	1·2	...	...	0·05
Malformations	1	...	1	0·06	0·0	...	0·05	0·00
Poisons	2	...	...	0·04	0·1	...	...	0·00
Parasites	...	...	...	...	...	...	...	...
No appreciable disease	11	...	...	0·34	0·5	...	...	0·02
Other causes	1	...	...	0·05	0·0	...	...	0·00
Suicides	...	...	...	...	...	...	...	...
Total	8,499	54	123	305·53	396·4	2·52	5·7	14·25

TABLE XXI.

INDIAN OFFICERS AND INDIAN OTHER RANKS.

BURMA DISTRICT.

Table showing the average strength, admissions into hospital, deaths, numbers invalided and constantly sick, during the year 1933, with ratios per 1,000 of the strength.

Diseases.	Admissions.	Deaths.	Invalids.	Average number constantly sick.	Ratio per 1,000. Admissions.	Deaths.	Invalids.	constantly sick.
Average strength....3,001								
Specific diseases due to infection or infestation.								
Cholera	...	...	...	...	...	...	...	...
Dengue	105	...	...	2·48	35·0	...	...	0·83
Diphtheria	...	...	...	...	...	...	...	...
Dysentery bacillary	13	...	...	0·35	4·3	...	...	0·12
,, ,, exudate	4	...	...	0·18	1·3	...	...	0·06
,, amœbic	3	...	...	0·21	1·0	...	...	0·07
,, clinical	9	...	...	0·16	3·0	...	...	0·05
Enteric fever (inclusive of typhoid, para. A, B, & C. and enteric group).	2	...	...	0·23	0·7	...	...	0·08
Erysipelas	...	...	...	...	...	...	...	...
Influenza	248	...	...	5·87	82·6	...	...	1·96
Malaria	296	...	...	8·84	98·6	...	...	2·95
Measles	...	...	...	...	...	...	...	...
Meningococcal infection (cerebro-spinal fever)	...	...	...	...	...	...	...	...
Mumps	3	...	...	0·16	1·0	...	...	0·06
Plague	...	...	...	...	...	...	...	...
Pneumonia	26	...	...	1·76	8·7	0·33	...	0·59

Pyrexia of uncertain origin	1	...	...	0·06	0·3	...	...	0·02
Rheumatic fever	4	...	...	0·70	1·3	...	...	0·23
Sandfly fever	...	...	...	...	...	...	...	...
Scabies	110	...	...	3·22	36·7	...	...	1·07
Scarlet fever	...	...	...	...	...	...	...	...
Small-pox	...	...	...	...	...	...	...	...
Tuberculosis — Pulmonary	7	...	10	0·83	2·3	...	3·33	0·28
Tuberculosis — Other	2	1	...	0·71	0·7	0·33	...	0·24
Venereal diseases — Gonorrhœa	53	...	...	6·09	17·7	...	...	2·03
Venereal diseases — Soft chancre	19	...	...	3·25	6·3	...	...	1·08
Venereal diseases — Syphilis	58	...	...	5·42	19·3	...	...	1·81
Venereal diseases — Other V. D.	3	...	...	0·37	1·0	...	...	0·12
Typhus fever	...	...	...	...	...	...	...	...
Other diseases due to infection or infestation	91	...	...	2·47	30·3	...	...	0.82
Other diseases classified under systems.								
Diseases of the nervous system	18	1	1	1·41	6·0	0·33	0·33	0·47
Mental diseases	7	...	3	0·54	2·3	...	1·00	0·18
Diseases of the eye	28	...	1	1·47	9·3	...	0·33	0·49
Diseases of the ear and nose	48	...	...	0·94	16·0	...	...	0·31
Diseases of the circulatory system — Valvular diseases of the heart	...	...	...	...	...	...	...	...
Diseases of the circulatory system — Disordered action of the heart	4	...	...	0·39	1·3	...	...	0·13
Diseases of the circulatory system — Other diseases	1	1	...	0·04	0·3	0·33	...	0·01
Diseases associated with abnormalities of the blood	10	...	...	0·83	3·3	...	...	0·28
Diseases of the spleen	1	...	...	0·09	0·3	...	...	0·03
Diseases of the lymphatic system	16	...	...	1·56	5·3	...	...	0·52
Diseases of ductless or endocrine glands	...	...	...	...	...	...	...	...
Diseases of the breast	...	...	...	...	...	...	...	...
Diseases of the respiratory system — Larynx and trachea	3	...	...	0·08	1·0	...	...	0·03
Diseases of the respiratory system — Bronchi and bronchioles	73	...	2	3·13	24·3	...	0·67	1·04
Diseases of the respiratory system — Lung, other than tuberculosis and pneumonia.	...	...	...	...	...	...	...	...
Diseases of the respiratory system — Other diseases	6	...	...	0·62	2·0	...	...	0·21

Diseases.	Admissions.	Deaths.	Invalids.	Average number constantly sick.	Ratio per 1,000. Admissions.	Deaths.	Invalids.	Constantly sick.
Other diseases classified under systems—contd.								
Diseases of the teeth and gums	9	...	...	0·29	3·0	...	...	0·10
Diseases of the Digestive: Inflammation of the tonsils	41	...	...	1·09	13·7	...	...	0·36
Diseases of the Digestive: Liver diseases	15	...	1	1·32	5·0	...	0·33	0·44
Diseases of the Digestive: Other diseases	212	...	2	5·16	70·6	...	0·67	1·72
Diseases due to disorders of nutrition or of metabolism	1	...	...	0·13	0·3	...	...	0·04
Diseases of the generative system	18	...	...	1·50	6·0	...	...	0·50
Diseases of Bones, Joints, Muscles, Fasciae and Bursae	37	...	1	1·70	12·3	...	0·33	0·57
Diseases of the areolar tissue	116	...	...	5·11	38·7	...	...	1.70
Diseases of the skin	58	...	...	2·22	19·3	...	...	0·74
Diseases of the urinary organs	6	...	...	0·27	2·0	...	...	0·09
Injuries: General	...	1	...	...	...	0·33	...	...
Injuries: Local	145	1	...	7·29	48·3	0·33	...	2·48
Injuries: In action	...	...	...	...	...	...	...	...
Tumours and cysts	6	...	...	0·36	2·0	...	...	0·12
Malformations	...	...	...	...	...	...	...	...
Poisons	2	1	...	0·16	0·7	0·33	...	0·05
Parasites	...	...	...	...	...	...	...	...
No appreciable disease	2	...	...	0·11	0·7	...	...	0·04
Other causes	...	...	...	...	...	...	...	...
Suicides*	...	(1)	...	...	...	(0·33)	...	...
Total	1,940	7	21	81·17	646·5	2·33	7·00	27·05

*The figures against "Suicides" having already been shown under the heading of the injury, etc., which caused death, are not included in the total.

TABLE XXII.

INDIAN OFFICERS AND INDIAN OTHER RANKS.

Table showing monthly ratios per 1,000 of strength of admissions for certain diseases for All-India during the year 1933.

	Enteric group of fevers.	Influenza.	Cholera.	Small-pox.	Malaria.	Dysentery protozoal.	Dysentery bacillary.	Dysentery bacillary exudate.	Dysentery group.	Pyrexia of uncertain origin.	Pneumonia lobar and lobular.	Diarrhœa.	Dengue.	Sand-fly fever.	Plague.	Effects of heat.	All causes.
January	0·1	2·3	..	0·04	4·4	0·02	0·1	0·2	0·1	0·02	1·2	0·2	0·1	0·1	..	..	27·6
February	0·1	1·0	..	0·05	2·2	0·01	0·1	0·1	0·1	0·02	0·7	0·2	0·02	0·1	..	..	19·9
March	0·1	0·6	..	0·10	2·6	0·02	0·2	0·2	0·2	...	0·5	0·2	0·01	0·03	..	..	23·6
April	0·2	0·4	..	0·10	3·2	0·03	0·4	0·3	0·2	..	0·4	0·4	0·1	0·2	..	..	24·7
May	0·2	0·4	..	0·04	5·7	0·1	0·6	0·4	0·3	0·02	0·4	0·8	0 2	1·2	..	0·01	30·8
June	0·3	0·3	..	0·04	8·8	0·1	0·6	0·5	0·3	..	0·3	0·7	0·2	1·8	..	0·2	34·2
July	0·2	0·6	..	0·02	11·4	0·1	0·4	0·5	0·2	0·01	0·2	0·8	0·3	2·0	..	0·3	39·4
August	0·3	1·0	..	..	21·1	0·1	0·8	0·5	0·3	0·01	0·2	0·8	0·2	2·1	..	0·03	51·3
September	0·2	1·8	..	..	39·0	0·1	1·0	0·5	0·5	..	0·4	0·9	0·2	1·5	0·01	0·01	69·8
October	0·1	1·1	..	..	64·3	0·1	0·7	0·5	0·4	0·02	0·3	1·2	0·4	1·4	0·02	..	92·9
November	0·1	0·5	..	..	34·9	0·0	0·5	0·6	0·4	0·01	0·5	0·8	0·2	0·2	0·01	..	61·0
December	0·2	0·6	..	0·03	12·0	0·1	0·4	0·4	0·2	..	0·7	0·6	0·3	0·1	0·01	0·01	35·5
Total	2·1	10·7	..	0·40	211·3	0·7	5·7	4·6	3·2	0·1	5·9	7·7	2·0	10·2	0·1	0·6	511·

TABLE

INDIAN OFFICERS AND

Table showing ratios per 1,000 of strength of admissions for certain

Stations and Districts.	Average annual strength.	Enteric Group of fevers.					Dysentery.				
		Typhoid fever.	Para. A.	Para. B.	Para. C.	Enteric group.	Bacillary.	Bacillary exudate.	Protozoal.	Clinical.	Colitis.
Shagai	641	..	..	..	..	3·1	7·8	3·1	..	6·2	..
Chakdara	54	..	..	..	..	..	..	..	..	..	..
Chitral	126	..	..	..	..	..	..	7·9	..	7·9	7·9
Dargai	33	..	..	..	..	..	..	..	..	..	..
Drosh	809	..	..	..	..	2·5	..	8·7	..	1·2	..
Landikotal	1,755	..	..	..	..	2·3	6·3	9·1	..	7·4	..
Malakand	605	..	..	..	..	..	..	..	..	..	..
Mardan	914	..	..	..	..	..	1·1	1·1	..	2·2	..
Nowshera	3,335	0·3	0·3	..	..	1·5	3·6	12·9	0·3	1·5	..
Peshawar	5,511	..	0·2	..	..	1·5	6·9	11·4	..	4·7	0·4
Risalpur	363	..	..	..	..	2·8	..	2·8	..	..	..
Peshawar Distt.	14,146	0·1	0·1	..	..	1·6	4·7	9·5	0·1	3·7	0·2
Fort Lockhart	320	..	..	..	..	..	12·5	..	..	9·4	..
Hangu	191	..	..	..	..	..	15·7	..	..	15·7	..
Kohat	3,785	0·3	..	..	..	0·3	19·8	0·5	0·3	3·2	..
Thal	891	..	..	..	..	1·1	3·4	..	..	..	2·2
Kohat District	*5,203	0·2	..	..	..	0·3	16·3	0·4	0·6	3·5	0·4
Abbottabad	3,705	2·2	0.3	..	0·3	0·3	..	1·6	..	1·3	..
Khyragali	80	..	..	..	..	..	..	..	25·0	..	..
Campbellpore	349	2·9	2.9	..	..	..	2·9	8·6	2·9	2·9	..
Jhelum	2,208	0·5	1.4	..	..	0·5	1·4	4·1	..	6·3	..
Kalabagh (Hazara)	94	..	..	..	..	..	..	..	..	10·6	..
Kuldana	181	5·5	5·5	..	..	..	..	..	..	..	..
Mona	42	..	..	..	..	..	..	..	..	..	23·8
Rawalpindi	4,055	1·5	1·0	..	0·2	1·5	5·9	10·9	1·5	9·6	..
Sargodha	46	..	..	..	..	..	..	..	21·7	..	..
Rawalpindi District	*10,948	1·6	0.9	..	0·2	0·7	2·6	5·7	0·9	5·5	0·1
Ambala	2,311	1·3	0·4	..	..	0·4	3·0	..	..	8·7	..
Amritsar	159	..	..	..	..	..	..	25·2	..	6·3	..
Bakloh	1,044	..	..	..	..	1·0	..	..	1·0	2·9	..
Dagshai	11	..	..	..	..	..	..	..	..	..	..
Dalhousie	13	..	..	..	..	..	..	..	..	..	..
Dharamsala	771	..	..	..	..	1·3	1·3	..	..	..	..
Ferozepore	2,043	1·0	0·5	..	..	1·5	1·0	2·9	0·5	1·5	..
Jullundur	2,099	0·5	..	..	..	2·4	..	3·8	..	2·9	..
Jutogh	177	5·6	..	..	..	..	22·6	11·3	..	33·9	..
Lahore	2,393	1·7	1·7	..	..	2·9	1·7	2·5	..	14·2	..
Multan	618	..	..	..	..	..	1·6	11·3	..	6·5	..
Subathu	7	..	..	..	..	..	..	..	..	..	..
Sialkot	2,175	0·5	..	..	..	0·9	0·9	1·4	..	2·8	..
Solon	1	..	..	..	..	..	..	..	..	..	..

XXIII

INDIAN OTHER RANKS.

diseases in each Station and District in India during the year 1933.

Diarrhœa.	Cholera.	Venereal diseases.	Small-pox.	Malaria.	Dengue.	Sand-fly fever.	Plague.	Influenza.	Pneumonia and lobar lobular.	Heat-stroke.	Heat-exhaustion.	All causes.	Average number constantly sick.
1·6	..	10·9	..	259·0	..	1·6	..	..	9.4	..	...	634·9	13·51
..	..	..		55·6	...	...	..	..	18·5	..	..	166·7	3·52
7·9	..	..	..	166·7	..	39·7	..	..	..	..	..	452·4	18·73
..	..	..	..	3·0	..	..	..	..	..	..	..	9·1	0·21
21·0	..	3·7	..	145·9	..	8·7	..	3·7	1·2	..	..	339·9	11·27
7·4	..	10·8	..	184·6	..	86·6	..	17·1	4·6	..	..	579·5	18·07
..	..	6·6	..	454·5	..	3·3	..	..	8·3	..	..	562·0	14·88
4·4	..	15·3	..	566·7	..	1·1	..	10·9	10·9	..	17·5	937·6	25·95
11·1	..	6·6	1·5	450·7	..	9·0	..	..	4·8	0·6	0·9	725·0	21·58
10·9	..	16·1	0·5	475·8	..	20·3	..	4·9	7·4	..	1·5	795·1	24·66
5·5	..	5·5	..	49·6	..	..	..	..	..	..	...	369·1	10·58
0·5	..	11·3	0·6	393·7	..	21·9	..	4·9	6·2	0·1	1·9	699·8	20·96
..	..	9·4	3·1	353·1	..	..	..	..	9·4	..	...	550·0	14·53
..	..	..	..	68·1	..	..	..	..	..	..	...	439·8	9·90
8·4	..	3·4	0·8	308·9	..	10·6	..	..	7·1	..	0·3	580·2	19·01
12·3	..	14·6	2·2	338·9	..	23·6	..	..	7·9	..	..	637·5	16·39
4·6	..	5·6	1·2	306·9	..	11·7	..	..	7·1	..	0·2	581·2	17·89
18·1	..	7·6	0·3	330·1	..	3·2	..	11·8	11·9	..	..	561·4	16·18
12·5	..	..	..	50·0	..	..	..	..	..	..	..	287·5	10·38
8·6	..	2·9	..	286·5	..	25·8	..	..	..	..	..	501·4	10·14
10·0	..	12·2	..	256·8	..	9·1	..	4·1	7·7	0·9	..	579·3	17·43
10·6	..	..	..	74·5	..	21·3	..	..	..	..	..	425·5	12·23
22·1	..	11·0	..	105·0	..	38·7	..	..	33·1	..	...	519·3	23·54
71·4	..	..	..	690·5	..	..	..	..	..	..	..	1,261·9	20·00
9·6	..	7·6	0·7	358·3	..	27·4	..	13·8	7·9	..	..	638·7	21·14
43·5	..	..	..	152·2	..	65·2	..	21·7	21·7	..	..	913·0	16·96
13·0	..	8.1	0.4	311·4	..	15·0	..	9·9	9·1	0·2	..	582·4	17·86
11·3	..	6·1	0·4	219·0	..	..	..	..	3·0	..	..	521·9	16·64
..	..	..	..	132·1	..	..	..	..	..	..	..	641·5	17·17
3·8	..	5·7	..	205·9	..	19·2	..	..	2·9	..	..	371·6	9·84
..	..	..	..	181·8	..	..	..	..	..	..	..	181·8	3·64
..	..	..	..	..	..	..	..	..	..	..	..	153·8	36·92
2·6	..	25·9	..	224·4	..	..	..	..	5·2	..	..	394·3	11·41
9·3	..	6·9	..	136·6	..	28·9	..	32·3	7·8	..	..	426·8	12·47
9·1	..	4·8	0·5	121·0	..	3·3	..	6·7	11·9	..	..	363·0	12·75
39·5	..	39·5	..	45·2	..	..	..	5·6	11·3	..	..	480·2	15·03
7·1	..	9·6	0·4	231·5	..	25·9	..	85·2	5·0	..	5·0	653·2	22·46
4·9	..	16·2	..	250·8	..	4·9	..	3·2	16·2	..	..	681·2	23·20
16·1	..	1·8	0·5	121·4	..	7·8	..	..	5·5	..	..	460·7	18·70
..	..	..	..	..	..	..	..	..	..	..	..	..	..

TABLE—

Stations and Districts.	Average annual strength.	Enteric group of fevers.					Dysentery.				
		Typhoid fever.	Para. A.	Para. B.	Para. C.	Enteric group.	Bacillary	Bacillary exudate.	Protozoal.	Clinical.	Colitis.
Lahore District	*13,951	0·9	0·4	..	..	1·4	1·5	2·6	0·1	5·9	..
Bannu	2,032	3·0	1·5	0·5	..	0·5	5·4	..	1·0	0·5	0·5
D. I. Khan	104	..	..	..	..	..	9·6	..	..	..	..
Kalabagh and Mari Indus	106	..	9·4	..	..	..	..	..	..	..	..
Manzai	797	3·8	2·5	..	..	..	30·1	..	..	3·8	..
Razmak	4,786	..	..	..	..	..	16·7	1·0	1·0	1·3	..
Mir Ali	1,179	1·7	..	..	..	..	8·5	1·7	..	4·2	..
Wana	2,824	..	..	..	..	0·7	2·5	4·6	..	0·7	..
Waziristan District	11,828	0·9	0·5	0·1	..	0·3	11·2	1·7	0·6	1·4	0·1
Chaman	1,582	2·5	0·6	..	..	5·1	3·2	10·7	..	9·5	..
Quetta	6,915	1·0	0·6	..	..	0·1	16·6	8·4	3·0	9·0	..
Baluchistan District	*8,509	1·3	0·6	..	..	1·1	14·1	8·8	2·5	9·0	..
Fort Sandeman	2,132	..	..	..	..	0·9	3·3	12·7	..	..	..
Loralai	517	..	..	..	..	..	..	..	..	..	..
Hindubagh	266	..	..	..	..	..	..	3·8	..	..	..
Zhob Bde. Area	*2,983	..	..	..	..	0·7	2·3	9·4	..	..	..
Hyderabad	66	..	..	..	..	..	15·2	..	..	..	..
Karachi	1,656	1·2	0·6	..	..	0·6	10·9	0·6	0·6	4·2	..
Sind Bde. Area	1,722	1·2	0·6	..	..	0·6	11·0	0·6	0·6	4·1	..
Almora	178	..	..	..	..	..	..	..	..	5·6	..
Bareilly	1,182	..	..	..	..	1·7	4·2	1·7	1·7	0·8	..
Dehra Dun	1,485	0·7	0·7	..	..	1·3	2·0	6·1	3·4	2·0	..
Jhansi	2,147	2·3	0·5	..	..	3·3	8·8	2·8	0·5	2·3	..
Landsdowne	1,406	..	..	..	..	0·7	7·8	17·8	..	2·8	..
Meerut	2,521	1·2	1·2	..	..	1·2	9·1	4·4	3·6	..	..
Nowgong K. C.	125	..	..	..	..	..	..	8·0	..	..	..
Roorkee	1,729	..	0·6	..	..	..	..	1·7	..	..	..
Meerut District	*10,774	0·8	0·6	..	..	1·4	5·7	5·3	1·6	1·3	..
Allahabad	817	..	1·2	..	..	..	6·1	2·4	4·9	1·2	..
Benares	739	..	..	..	..	..	1·4	1·4	..	1·4	..
Cawnpore	85	..	..	..	..	..	..	..	..	..	..
Fatehgarh	649	..	..	..	..	..	1·5	..	..	1·5	..
Fyzabad	595	..	..	..	..	..	..	1·7	..	1·7	..
Gorakhpore	151	..	..	..	..	..	..	6·6	..	..	6·6
Lucknow	1,967	..	..	..	..	2·5	6·1	4·6	2·5	6·1	..
Lucknow District	*5,061	..	0·2	..	..	1·0	3·8	2.8	1·8	3·2	0·2
Alipore	1,615	0·6	..	..	..	0·6	1·2	3·1	3·1	5·0	..
Dinapore	38	..	..	..	..	..	..	26·3	..	..	..
Ghoom	51	..	..	..	..	..	..	..	..	..	..
Gyantse	92	..	..	..	..	..	..	..	..	..	..
Shillong	1,516	0·7	..	..	..	..	11·2	3·3	..	0·7	..
Comilla	496	..	..	..	..	2·0	..	..	..	..	4·0
Midnapore	490	..	..	..	..	..	4·1	..	..	4·1	..
Dacca	69	..	..	..	..	..	..	..	..	..	72·5
Mymensingh	456	..	..	..	..	..	..	..	..	..	..
Saidpur	554	..	..	..	..	..	..	..	3·6	..	..
Bankura	538	..	..	..	..	..	..	11·2	..	..	..

*The difference in totals of strengths is due to inclusion of figures of the Line of March.

XXIII—*contd.*

Diarrhœa.	Cholera.	Venereal diseases.	Small-pox.	Malaria.	Dengue.	Sand-fly fever.	Plague.	Influenza.	Pneumonia and lobar lobular.	Heat-stroke.	Heat-exhaustion.	All causes.	Average number constantly sick.
9·5	..	7·7	0·3	174·3	..	12·0	..	20·6	6·5	..	0·9	480·9	16·09
..	..	11·3	0·5	395·2	..	64·0	..	26·1	5·9	..	..	758·9	27·16
..	..	..	..	490·4	..	9·6	..	..	9·6	..	..	711·5	19·04
28·3	..	94·3	9·4	198·1	..	9·4	..	..	18·9	..	..	1,637·7	25·19
30·1	..	8·8	..	133·0	..	27·6	..	36·4	3·5	..	2·5	333·8	10·10
1·7	..	2·7	..	104·7	..	..	..	..	11·3	..	..	433·1	16·75
5·1	..	9·3	..	240·0	..	22·1	..	8·5	12·7	..	..	644·6	10·12
12·0	..	2·1	0.4	366·9	..	14·9	..	..	11·0	..	..	703·6	21·20
6·3	..	5·9	0·3	236·8	..	18·8	..	7·8	9·9	..	0·2	575·9	18·59
34·1	..	10·7	1·3	121·4	..	8·8	..	3·8	5·1	..	0·6	383·1	10·33
4·2	..	6·2	..	261·0	..	1·2	..	13·3	6·8	..	..	532·6	20·22
9·8	..	7·1	0·2	234·7	..	2·6	..	11·5	6·5	..	0·1	501·7	18·36
8·4	..	2·8	..	529·5	..	30·5	..	..	4·2	..	..	699·3	15·61
30·9	..	3·9	..	375·2	..	9·7	..	..	11·6	..	..	576·4	14·22
..	..	3·8	..	218·0	..	26·3	..	..	3·8	..	..	368·4	6·02
11·4	..	3·0	..	463·0	..	25·8	..	..	5·4	..	..	632·6	14·16
..	..	..	..	197·0	..	15·2	..	..	..	..	..	363·6	12·88
..	..	6·0	2·4	210·1	0·6	..	..	..	2·4	..	..	344·8	10·97
..	..	5·8	2·3	209·6	0·6	0·6	..	..	2·3	..	..	345·5	11·04
..	..	..	..	207·9	..	..	..	..	11·2	..	..	618·0	28·54
14·4	..	3·4	..	77·0	..	1·7	..	..	5·1	..	..	482·2	15·52
2·0	..	14·1	..	162·3	..	..	..	..	3·4	..	..	445·1	17·23
9·3	..	12·6	..	90·4	..	6·9	..	6·5	4·7	..	..	464·4	14·18
13·5	..	8·5	..	120·9	..	..	..	..	10·0	..	..	436·0	21·41
10·7	..	11·5	0·8	53·9	..	0·8	..	0·8	4·4	..	..	363·7	16·05
..	..	..	..	96·0	..	..	..	..	..	..	..	184·0	4·72
2·3	..	4·6	..	64·2	..	..	..	..	4·6	..	..	216·9	8·37
8·4	..	9·4	0·2	92·1	..	0·6	..	0·3	5·2	..	..	396·0	15·32
4·9	..	13·5	..	69·8	..	25·7	..	..	4·9	..	..	433·3	21·00
..	..	8·1	..	70·4	50·1	46·0	..	6·8	5·4	..	..	496·6	17·60
..	..	..	..	82·4	..	..	..	..	..	..	..	352·9	13·06
4·6	..	7·6	3·1	94·0	1·5	..	..	..	16·9	..	..	362·1	12·76
3·4	..	11·8	..	95·8	..	..	..	48·7	5·9	..	..	358·0	12·17
..	..	..	..	476·8	..	..	..	..	13·2	..	..	821·2	26·49
2·0	..	11·7	0·5	83·4	..	1·0	..	..	5·6	..	..	385·9	18·32
2·6	..	10·3	0·6	92·9	7·5	11·3	..	6·7	6·9	..	..	441·4	17·1
3·7	..	28·5	..	95·4	10·5	..	..	19·8	1·2	..	..	309·0	17·01
..	..	..	..	26·3	..	52·6	..	78·9	..	..	..	324·3	11·62
..	..	19·6	..	78·4	..	..	..	..	..	..	..	235·3	7·84
..	..	..	..	10·9	..	..	..	..	10·9	..	..	86.9	8·69
0·7	..	26·4	..	148·4	..	..	..	24·4	5·3	..	..	336·4	15·22
..	..	20·2	..	284·3	..	..	..	22·2	6·0	..	2·6	544·4	14·46
10·2	..	24·5	2·0	134·7	..	..	..	..	4·1	..	..	391·8	7·33
..	..	..	..	173·9	..	..	..	14·5	..	..	..	507·2	9·13
6·6	..	8·8	..	57·0	..	..	..	..	6·6	..	..	449·6	14·04
5·4	..	18·1	..	214·8	..	..	..	68·6	1·8	..	..	382·7	7·87
..	..	55·8	..	224·9	..	9·3	..	..	1·9	..	..	625·7	16·65

TABLE—

Stations and Districts.	Average annual strength.	Enteric group of fevers.					Dysentery.				
		Typhoid fever.	Para. A.	Para. B.	Para. C.	Enteric group.	Bacillary.	Bacillary exudate.	Protozoal.	Clinical.	Colitis.
P. & A. District.	5,830	0·3	..	..	..	0·3	3·6	2·9	1·2	1·9	1·2
Agra	92	..	..	..	..	..	..	..	..	..	..
Delhi	1,465	0·7	..	..	..	..	..	1·4	..	1·4	0·7
Muttra	607	..	..	..	..	4·9	4·9	..	..	4·9	19·8
Delhi Bde. Area	2,164	0·5	..	..	..	1·4	1·4	0·9	..	2·3	6·0
Ahmednagar	987	2·0	..	1·0	..	1·0	6·1	3·0	..	..	..
Aurangabad	902	..	..	..	..	..	4·4	8·9	..	3·3	..
Jubbulpore	2,116	..	..	..	..	2·4	3·8	6·6	0·5	..	..
Trimulgherry	2,952	0·7	..	..	..	3·7	9·1	8·1	0·7	3·7	..
Kamptee	444	..	..	..	..	..	4·5	4·5	..	2·3	..
Pachmarhi	377	..	..	..	..	..	5·3	..	..	..	..
Saugor	549	..	..	..	..	3·6	..	5·5	..	..	..
Deccan District	8,237	0·5	..	0·1	..	2·3	5·9	6·5	0·4	1·8	..
Belgaum	1,139	..	..	..	..	..	0·9	6·1	0·9	0·9	..
Poona	4,066	0·5	..	..	..	..	7·6	2·5	1·0	1·2	..
Poona Bde. Area	5,205	0·4	..	..	..	..	6·1	3·3	1·0	1·2	..
Mhow	834	2·4	1·2	..	..	..	14·4	3·6	2·4	3·6	1·2
Mt. Abu	18	..	..	..	..	..	..	..	..	..	..
Nasirabad	867	1·2	..	..	..	1·2	9·2	8·1	3·5	2·3	..
Neemuch	578	1·7	..	..	..	3·5	..	1·7	..	17·3	..
Ahmedabad	499	2·0	..	..	..	..	..	6·0	..	6·0	..
Baroda	503	..	..	..	..	4·0	..	..	..	..	..
Bombay	753	..	..	..	..	..	6·6	8·0	..	1·3	..
Deolali	154	..	..	..	..	..	6·5	..	..	6·5	..
Bombay District	4,206	1·2	0·2	..	..	1·2	6·2	4·8	1·2	4·8	0·2
Bangalore	2,477	1·2	..	..	..	0·4	8·1	6·1	0·4	0·4	..
Cannanore	561	..	..	..	..	..	1·8	..	..	..	1·8
Madras & St. Thomas Mt.	500	..	..	..	..	..	2·0	22·0	..	..	..
Trichinopoly	115	..	..	..	..	..	..	..	..	..	..
Wellington	50	..	..	..	..	..	20·0	20·0	20·0	..	..
Madras District	3,703	0·8	..	..	..	0·3	6·2	7·3	0·5	0·3	0·3
Mandalay	877	..	..	..	..	..	..	..	..	..	..
Maymyo	1,339	..	..	..	0·7	0·7	3·0	2·2	1·5	6·7	..
Mingaladon	785	..	..	..	..	..	11·5	1·3	1·3	..	..
Burma District	3,001	..	..	..	0·3	0·3	4·3	1·3	1·0	3·0	..
All-India	117,561	0·7	0·3	0·02	0·03	1·0	6·2	4·9	0·8	3·5	0·3

XXIII—*concld.*

Diarrhœa.	Cholera.	Venereal diseases.	Small-pox.	Malaria.	Dengue.	Sand-fly fever.	Plague.	Influenza.	Pneumonia and lobar lobular.	Heat-stroke.	Heat-exhaustion.	All causes.	Average number constantly sick.
3·1	..	26·2	0·2	149·2	2·9	1·2	..	20·9	3·6	..	0·2	394·0	14·29
10·9	..	10·9	..	65·2	..	152·2	..	..	..	..	..	782·6	23·04
16·4	..	13·0	0·7	277·1	..	..	..	3·4	2·7	..	..	618·4	21·04
..	..	8·2	..	294·9	..	80·7		24·7	8·2	..	..	708·4	15·22
11·6	..	11·6	0·5	278·1	..	29·1	..	9·2	4·2	..	..	650·6	19·50
8·1	..	9·1	..	71·9	..	..	..	..	4·1	..	..	352·6	8·35
..	..	10·0	..	215·1	..	8·9	..	..	5·5	..	..	427·9	12·76
14·7	..	5·7	..	91·2	..	4·7	..	1·9	1·4	..	..	514·7	14·97
3·4	..	10·2	..	31·8	0·3	6·4	0·3	..	1·7	..	1·0	318·3	14·52
..	..	4·5	..	38·3	9·0	33·8	..	..	2·3	..	..	495·5	18·67
10·6	..	..	..	137·9	..	..	..	2·7	..	..	..	281·2	6·21
7·3	..	12·8	..	45·5	..	10·9	..	3·6	3·6	..	..	298·7	11·68
6·8	..	8·3	..	77·6	0·6	7·0	0·1	0·8	2·4	..	0·4	390·8	13·37
5·3	..	17·6	2·6	36·9	..	..	..	29·0	1·8	..	..	377·5	15·94
4·7	..	19·9	..	123·2	..	0·2	1·5	4·7	3·4	..	0·2	328·8	11·72
4·8	..	19·4	0·6	104·3	..	0·2	1·2	10·0	3·1	..	0·2	339·5	12·65
4·8	..	1·2	..	164·3	..	..	..	..	6·0	..	..	354·9	12·83
55·6	..	..	..	388·9	..	..	..	..	..	..	..	555·6	14·44
8·1	..	3·5	1·2	139·6	..	11·5	..	..	4·6	..	..	468·3	18·94
1·7	..	5·2	..	605·5	..	..	..	..	3·5	..	..	801·0	14·67
2·0	..	6·0	..	186·4	..	..	..	..	2·0	..	..	282·6	6·79
4·0	..	..	..	230·6	..	..	..	2·0	4·0	..	..	361·8	7·97
6·6	..	8·0	..	55·8	..	..	..	5·3	5·3	..	..	261·6	10·88
6·5	..	..	..	149·4	..	..	..	..	13·0	..	..	474·0	12·66
5·2	..	3·8	0·2	211·4	..	2·4	..	1·2	4·8	..	..	420·4	12·70
11·7	..	28·7	0·4	17·8	19·0	..	..	300·3	5·7	..	..	416·6	20·32
1·8	..	12·5	..	60·6	1·8	..	..	12·5	3·6	..	..	465·2	17·31
6·0	..	12·0	..	42·0	60·0	..	..	128·0	2·0	..	..	732·0	26·82
..	..	8·7	..	..	..	..	..	..	17·4	..	..	191·3	4·78
20·0	..	100·0	..	60·0	..	..	..	20·0	..	..	..	580·0	19·60
9·2	..	24·3	0·3	27·5	21·1	..	..	39·7	5·1	..	..	461·8	20·25
3·4	..	63·9	..	13·7	30·8	..	..	..	5·7	..	..	317·0	19·87
15·7	..	50·8	..	177·7	..	..	..	185·2	12·7	..	..	941·1	37·12
..	..	11·5	..	58·6	99·4	..	..	..	5·1	..	..	510·8	17·87
8·0	..	44·3	..	98·6	35·0	..	..	82·6	8·7	..	..	646·5	27·05
7·9	..	10·8	0·4	212·2	2·1	10·4	0·1	11·0	6·2	0·03	0·4	510·9	17·1

TABLE XXIV.

BRITISH OFFICERS OF THE INDIAN ARMY.

Table showing the average strength, admissions into hospital, deaths, numbers invalided and average constantly sick during the year 1933, with ratios per 1,000 of the strength.

Diseases. Average strength 2,133	Admissions.	Deaths.	Invalids.	Average number constantly sick.	Ratio per 1,000. Admissions.	Deaths.	Invalids.	Constantly sick.
Specific Diseases due to infection or infestation.								
Cholera	...	...	...	...	...	...	...	...
Dengue	12	...	...	0·65	5·6	...	...	0·30
Diphtheria	6	...	...	0·31	2·8	...	...	0·15
Dysentery bacillary	4	...	...	0·08	1·9	...	...	0·40
,, ,, exudate	12	...	2	0·34	5·6	...	0·94	0·16
,, amoebic	3	...	...	0·15	1·4	...	...	0·07
,, clinical	3	...	...	0·07	1·4	...	...	0·03
Enteric fever (inclusive of typhoid, Para. A, B & C and enteric group).	7	...	...	0·73	3·3	...	...	0·34
Erysipelas	...	...	...	...	...	...	...	...
Influenza	29	...	...	0·53	13·6	...	...	0·25
Malaria	98	...	...	2·20	45·9	...	...	1·03
Measles	1	...	...	0·05	0·5	...	...	0·02
Meningococcal infection (cerebro-spinal fever)	...	...	...	...	...	...	...	...
Mumps	...	...	...	...	...	...	...	...
Plague	...	...	...	...	...	...	...	...
Pneumonia	7	1	...	0·48	3·3	0·47	...	0·20
Pyrexia of uncertain origin	1	...	...	0·02	0·5	...	...	0·01
Rheumatic fever	...	...	...	...	...	...	...	...
Sand-fly fever	37	...	3	0·76	17·3	...	1·41	0·36
Scabies	...	...	...	...	...	...	...	...
Scarlet fever	...	...	...	...	...	...	...	...
Small-pox	2	...	...	0·09	0·9	...	...	0·04
Tuberculosis — Pulmonary	1	...	1	0·20	0·5	...	0·47	0·09
Tuberculosis — Other	...	...	...	...	...	...	...	...
Venereal diseases — Gonorrhœa	...	...	...	...	...	...	...	...
Venereal diseases — Soft chancre	...	...	...	...	...	...	...	...
Venereal diseases — Syphilis	...	...	...	...	...	...	...	...
Venereal diseases — Other V. D.	...	...	...		...	...	...	...

Typhus group	2	...	...	0·04	0·9	...	...	0·02
Other diseases due to infection or infestation	10	1	...	0·15	4·7	0·47	...	0·07
Other diseases classified under systems.								
Diseases of the nervous system	12	...	1	0·40	5·6	...	0·47	0·19
Mental diseases	8	...	1	0·58	3·8	...	0·47	0·27
Diseases of the eye	10	...	...	0·15	4·7	...	...	0·07
Diseases of the ear and nose	19	...	...	0·46	8·9	...	...	0·22
Diseases of the circulatory system. — Valvular diseases of the heart	...	...	...	...	...	...	...	...
Diseases of the circulatory system. — Disordered action of the heart	5	...	...	0·18	2·3	...	...	0·08
Diseases of the circulatory system. — Other diseases	6	1	1	0·22	2·8	0·47	0·47	0·10
Diseases associated with abnormalities of the blood	...	...	...	...	...	...	...	...
Diseases of the spleen	...	...	...	...	...		...	...
Diseases of the lymphatic system	4	...	...	0·05	1·9	...	...	0·02
Diseases of ductless or endocrine glands	...	...	...	...	...	...	...	...
Diseases of the breast	...	...	...	...	...	...	...	...
Diseases of the respiratory system. — Larynx and trachea	3	...	...	0·06	1·4	...	...	0·03
Diseases of the respiratory system. — Bronchi & bronchioles	16	...	2	0·55	7·5	..	0·94	0·26
Diseases of the respiratory system. — Lung, other than tuberculosis and pneumonia.	1	...	...	0·02	0·5	...	...	0·01
Diseases of the respiratory system. — Other diseases	...	...	...	...	...	...	...	...
Diseases of the teeth and gums	8	...	...	0·37	3·8	...	...	0·17
Diseases of the digestive system. — Inflammation of tonsils	37	...	1	1·08	17·3	...	0·47	0·51
Diseases of the digestive system. — Liver diseases	31	...	1	1·24	14·5	...	0·47	0·58
Diseases of the digestive system. — Other diseases	128	1	8	4·02	60·0	0·47	3·75	1·88
Diseases due to disorders of nutrition or of metabolism	1	...	...	0·02	0·5	...	...	0·01
Diseases of the generative system	7	...	...	0·28	3·3	...	...	0·13
Diseases of Bones, Joints, Muscles, Fasciae and Bursae	21	...	...	1·23	9·8	...	...	0·58
Diseases of the areolar tissue	56	...	1	1·66	26·3	...	0·47	0·78
Diseases of the skin	10	...	2	0·26	4·7	...	0·94	0·12
Diseases of the urinary organs	19	1	3	1·02	8·9	0·47	1·41	0·48
Injuries — General	4	...	...	0·13	1·9	...	...	0·06
Injuries — Local	90	5	8	3·46	42·2	2·34	3·75	1·62
Injuries — In action	...	...	...	...	...	...	...	...
Tumours and cysts	1	...	...	0·01	0·5	...	...	0·00
Malformations	...	...	...	...	...	...	...	...
Poisons	...	...	...	...	...	...	...	...
Parasites	2	...	...	0·01	0·9	...	...	0·00
No appreciable disease	3	...	...	0·04	1·4	...	...	0·02
Other causes	...	...	...	...	...	...	...	...
Suicides*	...	(1)	...	...	...	(0·47)	...	...
Totals	737	10	35	24·30	345·5	4·69	16·41	11·39

* The figures against "Suicides" having already been shown under the heading of the injury, etc., which caused death, are not included in the total.

TABLE XXV.

INDIAN OFFICERS AND INDIAN OTHER RANKS.

Table showing admission and death ratios per 1,000 of strength by Commands contrasted with the previous year, and the average for the previous 5 years.

Commands.	Enteric group of fever.		Influenza.		Cholera.		Small-pox.		Malaria.		Dysentery.	
	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.
Northern Command	2·2	0·21	9·9	..	..	..	0·4	0·04	281·9	0·07	15·0	0·02
	2·2	0·16	12·3	0·02	0·0	..	0·2	0·03	164·4	0·17	13·6	..
	2·7	0·23	7·5	0·02	0·1	0·02	0·2	0·01	182·8	0·14	14·8	0·04
Western Command	2·3	0·23	7·4	..	..	..	0·5	..	283·0	0·08	27·0	..
	2·9	0·21	15·1	..	0·01	..	0·2	..	175·1	..	31·1	0·07
	2·7	0·18	4·2	0·04	0·01	..	0·2	..	139·8	0·06	23·2	0·06
Eastern Command	1·8	0·08	7·5	..	..	..	0·3	..	122·7	0·04	11·5	..
	2·0	0·13	6·6	..	0·0	0·08	0·1	..	130·0	..	15·8	0·08
	2·4	0·23	7·0	..	0·2	0·07	0·3	0·04	98·7	0·14	13·8	0·06
Southern Command	1·9	0·28	9·8	..	..	..	0·2	0·05	101·7	0·05	14·3	0·05
	1·7	0·05	7·4	..	..	..	0·2	0·05	79·1	..	17·0	..
	1·9	0·11	9·7	..	0·03	0·03	0·2	0·02	80·8	0·06	16·9	0·06
Burma District	0·7	..	82·6	..	..	..	..	..	98·6	..	9·6	..
	0·7	0·22	1·1	..	..	..	0·2	..	183·6	0·44	14·8	..
	3·1	0·09	14·0	..	0·05	..	0·2	..	170·6	0·24	11·5	..
All-India	2·1	0·20	11·0	..	..	..	0·4	0·03	212·2	0·06	15·3	0·02
	2·1	0·14	10·3	0·01	0·0	0·02	0·2	0·02	145·1	0·10	16·7	0·02
	2·5	0·20	7·6	0·01	0·1	0·03	0·2	0·01	141·9	0·12	15·9	0·05

	Pyrexia of uncertain origin.		Pneumonia lobar and lobular.		Venereal diseases.		Dengue.		Sand-fly fever.		Plague.	
	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.
Northern Command	0·0	..	7·7	0·87	8·1	0·02	..	..	16·5	..	..	0·02
	0·1	0·02	9·3	1·04	7·4	0·02	0·1	..	27·4	..	..	..
	0·1	0·01	10·4	1·37	8·3	0·01	0·04	..	26·9	..	..	..
Western Command	0·1	..	5·7	1·21	6·0	..	0·1	..	7·6	..	..	..
	0·1	..	8·5	0·92	5·0	..	0·4	..	8·9	..	..	..
	0·2	...	8·5	1·32	6·5	0·03	0·1	..	10·4	..	..	..
Eastern Command	0·2	..	5·1	0·42	13·8	..	2·3	..	5·6	..	..	..
	0·1	..	7·0	0·51	15·9	..	0·5	..	3·8	..	..	..
	0·1	0·01	7·6	0·93	15·8	0·01	1·5	..	2·9	..	..	..
Southern Command	0·2	0·05	3·5	0·61	12·8	..	3·9	..	3·2	..	0·3	0·23
	0·4	..	5·4	0·48	12·5	..	1·1	..	2·4	..	0·2	0·24
	0·6	0·01	5·5	0·63	16·3	..	3·0	..	1·3	..	0·1	0·04
Burma District	0·3	..	8·7	0·33	44·3	..	35·0	..	..	..	..	..
		..	5·5	0·44	39·3	..	21·6	..	..	..	0·2	..
	..	..	6·0	0·95	42·7	0·19	29·9	..	0·5	..	0·1	..
All-India	0·1	0·01	6·2	0·76	10·8	0 01	2·1	..	10·4	..	0·1	0·05
	0·2	0·01	7·9	0·80	10·9	0·01	1·2	..	15·3	..	0·0	0 04
	0·3	0·01	8·6	1·13	12·1	0·01	1·8	..	14·6	..	0·01	0·01

Note.—The three figures shown against each command are those of (1) for the year 1933 ; (2) for 1932 and (3) for 1928—32.

TABLE XXVI.

DETAIL OF DISEASES.

1933.

Diseases.	European Army of India.										Indian Army.							Jail population India.	
	British officers attached to European troops.			Men.				Women.		Children.		British officers attached to Indian troops.			Men present.				
	2,355.			54,996.				4,368.		6,694.		2,133.			117,561.				152,060.
	A.	D.	Invalids.	A.	Constantly sick.	D.	Invalids.	A.	D.	A.	D.	A.	D.	Invalids.	A.	D.	Invalids.	Constantly sick.	A.	D.
Diseases caused by infection.																				
Anthrax	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	..	..	0·11	..	..
Blackwater fever	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	1	..	0·02	2	2
Chicken-pox	..	..	..	12	0·46	..	..	..	..	9	..	1	..	..	121	..	..	7·89	633	1
Cholera	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	5	..
Cow-pox	..	..	..	4	0·06	..	..	1	..	..	..	..	..	..	5	..	..	0·22	..	..
Dengue	21	..	..	644	14·28	..	..	28	..	16	..	12	..	..	244	..	..	5·47	155	1
Diphtheria	2	..	..	69	6·86	2	..	3	..	37	4	6	..	..	14	1	1	0·77	..	..
Dysentery—																				
(*a*) Protozoal	5	..	..	169	12·85	..	1	3	..	6	..	3	..	..	96	..	..	6·90		
(*b*) Bacillary	35	..	..	877	41·33	1	4	80	..	127	3	16	..	2	1,297	1	..	49·85	5,283	124
(*c*) Clinical	11	..	..	823	14·90	..	2	4	..	16	1	3	..	..	411	1	..	14·21		
Encephalitis	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..
Enteric Fevers—																				
(*a*) Typhoid fever	1	..	1	56	8·88	11	..	2	..	5	..	1	..	..	81	15	..	11·27		
(*b*) Paratyphoid A.	1	..	..	14	2·53	..	..	4	..	1	..	..	..	..	38	1	..	4·21		
(*c*) Paratyphoid B.	..	..	..	1	0·37	..	..	..	..	1	..	..	..	..	2	..	..	0·14	334	38
(*d*) Paratyphoid C.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	3	..	..	0·39		
(*e*) Enteric Group	5	..	1	102	14·17	3	..	1	..	3	..	6	..	..	120	7	..	15·67		
Enteritis infective. (Including food poisoning)	1	..	..	9	0·14	..	..	..	..	..	..	..	..	..	2	..	..	0·07	10	4
Erysipelas	..	..	..	13	0·73	..	..	2	..	2	1	..	..	..	5	..	..	0·17	50	5
Gangrene, acute infective	..	..	..	1	0·02	..	..	..	..	..	..	..	..	..	1	..	1	0·15	10	5
Hydrophobia (Rabies)	..	..	..	..	..	..	..	..	..	1	1	..	..	..	3	2	..	0·21	6	1
Influenza	46	1	..	1,144	30·29	3	..	17	..	30	..	29	..	..	1,293	..	..	29·84	4,629	18
Jaundice epidemic catarrhal	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Jaundice spirochætal	..	..	..	..	..	..	..	..	..	..	..	1	1	..	..	..	..	..	*36	8*

Leishmaniasis—																								
(*a*) Kala-azar	..	..	..	3	1·34	..	..	..	..	..	..	..	..	..	11	1	1	2·44	275	8
(*b*) Oriental sore	..	..	..	2	0·11	..	..	1	..	1	..	..	..	..	53	..	..	3·92	26	..
Leprosy	..	..	..	1	0·60	..	..	..	..	..	..	..	..	..	6	..	6	0·43	170	4
Malaria	107	..	1	5,681	165·19	3	2	152	..	170	1	98	..	..	24,945	7	6	511·55	26,639	101
Measles	..	..	..	9	0·50	..	..	..	..	25	..	1	..	..	174	4	..	8·70	81	..
Meningococcal infection (Cerebro-spinal fever)	..	..	..	3	0·66	2	2	1	1	..	..	..	..	..	26	15	..	2·05	106	54
Mumps	1	..	..	13	0·54	..	..	..	..	8	..	..	..	..	660	..	..	34·08	2,453	..
Plague	..	..	..	..	..	..	..	..	..	..	..	..	..	..	7	6	..	0·19	2	2
Pyæmia	..	..	..	3	0·46	1	2	..	..	..	..	..	..	..	4	1	..	0·55	..	..
Pyrexia of Uncertain Origin	4	..	..	61	3·64	..	..	..	..	1	..	1	..	..	12	1	..	2·31	1,343	4
Relapsing fever	..	..	..	..	..	..	..	..	..	..	..	..	..	..	44	..	..	1·70	..	..
Rheumatic fever	2	..	..	68	8·12	..	2	5	..	5	..	..	..	..	99	1	5	7·27	421	2
Rubella (German measles)	1	..	..	82	1·93	..	..	..	..	1	..	1	..	..	5	..	..	0·30	..	..
Sand-fly fever	65	..	..	2,252	45·47	..	..	8	..	20	..	37	..	3	1,227	..	..	24·31	669	..
Scarlet fever	1	..	..	6	0·71	..	..	..	..	7	..	..	..	..	4	..	..	0·45	..	..
Septicæmia	..	..	..	6	0·59	4	..	3	..	1	..	..	..	..	5	3	1	0·52	9	8
Small-pox	3	..	..	13	1·47	..	..	3	1	4	..	2	..	..	43	3	..	3·13	56	2
Tetanus	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	1	..	0·09	5	2
Tuberculosis Pulmonary	..	..	..	46	14·63	2	49	6	1	1	..	1	...	1	203	13	187	18·64	851	255
Tuberculosis Other cases	..	..	..	9	2·32	1	12	2	..	1	2	..	..	..	50	3	33	9·87	187	87
Typhus fever	4	1	..	23	2·19	..	..	..	..	3	..	2	..	..	19	1	..	1·69	..	..
Undulent fever	..	..	..	1	0·16	..	..	..	..	..	..	..	..	..	5	..	..	1·01	7	3
Venereal diseases—																				
(*a*) Gonorrhoea	..	..	..	1,276	162·45	..	1	..	..	2	..	..	..	..	557	..	3	61·87	428	1
(*b*) Soft chancre	..	..	..	275	28·97	..	..	..	..	..	..	..	..	..	257	..	..	27·75	101	..
(*c*) Syphilis	..	..	..	267	21·65	..	1	1	..	..	..	..	..	..	455	1	4	46·45	699	4
(*d*) Other cases	..	..	..	17	0·82	..	..	..	..	..	..	..	..	..	6	..	1	0·72	9	..
Whooping- cough	..	..	..	..	..	..	..	1	..	11	..	..	..	..	..	..	..	..	..	..
Other diseases caused by infection	5	1	1	83	1·60	..	1	10	..	12	2	2	..	..	278	1	..	5·68	263	4
Diseases due to infection by Metazoan Parasites.																				
Ankylostomaisis	..	..	..	3	0·46	..	..	..	..	..	..	..	..	..	349	..	..	18·04	1,921	27
Ascariasis	..	..	..	4	0 13	..	..	..	..	1	..	1	..	..	57	..	..	1·96	21	..
Bilharziasis	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..
Dracontiasis (Guinea-worm)	..	..	..	..	..	..	..	..	..	..	..	2	..	..	327	..	5	25·17	136	..
Intestinal tæniasis—																				
(*a*) Tænia Solium	..	..	..	73	1·26	..	..	3	..	12	..	3	..	..	30	1	..	0·77	..	..
(*b*) Tænia Saginata	5	..	..	74	1·58	..	..	6	..	22	..	1	..	..	29	..	..	0·84	..	..
Other Intestinal parasites	1	..	..	..	..	..	..	1	..	1	..	..	..	..	1	1	..	0·01	1	..
Pediculosis	..	..	..	4	0·06	..	..	..	..	..	..	..	..	..	5	..	..	0·09	..	..
Scabies	..	..	..	80	2·94	..	..	..	..	..	..	..	..	..	1,032	..	..	32·98	774	..
Other diseases due to infestation	..	..	..	11	0·52	..	..	..	..	4	..	..	..	..	11	..	..	0·35	219	..

* Weil's disease A.—Admissions. D.—Deaths.

TABLE XXVI—*contd.*

Diseases.	European Army of India.										Indian Army.						Jail population India. 152,060.	
	British officers attached to European troops.			Men.				Women.		Children.		British officers attached to Indian troops.			Men present.					
	A.	D.	Invalids.	A.	Constantly sick.	D.	Invalids.	A.	D.	A.	D.	A.	D.	Invalids.	A.	D.	Invalids.	Constantly sick.	A.	D.
Diseases of the nervous system.																				
Aphasia	...	...	...	...	...	...	...	...	...	1	...	...	...	...	1	...	...	0·04	...	1
Cerebral hæmorrhage	...	...	...	1	0·01	1	...	...	...	...	...	...	...	...	...	...	...	...	12	5
Chorea	...	...	...	1	0·17	...	...	...	...	1	...	...	...	...	...	...	...	...	1	...
Convulsions	...	...	...	2	0·14	...	...	...	...	11	5	...	...	...	...	...	...	...	...	...
Diseases of the spinal cord	...	...	...	8	1·58	1	4	...	...	...	...	...	...	...	3	...	2	0·39	...	...
Epilepsy	1	...	...	40	6·31	...	28	3	...	2	...	...	...	...	28	...	17	1·89	130	10
Meningitis	...	...	...	...	...	1	...	...	...	1	1	...	...	...	5	4	1	0·47	2	2
Neuralgia	...	...	...	34	1·62	...	1	2	...	...	...	1	...	...	31	...	...	0·65	131	...
Neuritis	1	...	1	47	3·18	...	5	5	...	...	...	2	...	...	36	...	3	3·16	21	1
Paralysis	1	...	1	10	0·76	...	1	...	...	1	...	...	...	...	32	...	...	1·59	25	1
Sciatica	6	...	1	...	...	...	...	...	...	...	...	1	...	...	103	...	6	5·04	40	...
Other diseases of the nervous system	9	1	...	246	7·44	2	4	18	...	6	1	8	...	1	127	5	6	5·01	243	41
Mental diseases.																				
Feeblemindedness	...	...	...	10	3·26	1	7	...	...	...	...	...	...	...	...	...	...	...	...	...
Hysteria	...	...	...	68	7·36	...	16	3	...	...	...	1	...	...	27	...	5	1·73	17	...
Involution (Melancholia)	...	...	...	9	3·71	...	8	...	...	...	...	...	...	...	2	...	2	0·18	27	1
Mania	...	...	...	1	0·42	...	1	1	...	...	...	...	...	...	10	...	8	0·87	33	1
Mental deficiency	...	...	...	2	0·17	...	...	...	...	...	...	...	...	...	1	...	...	0·06	16	...
Neurasthenia	1	...	3	40	3·35	...	14	13	...	...	...	3	...	...	41	...	12	3·34	5	...
Schizophrenia (Dementia præcox)	...	...	...	26	8·15	...	23	...	...	...	...	...	...	...	2	...	1	0·24	28	1
Other mental diseases	...	...	1	39	7·76	...	23	2	...	...	...	4	...	1	19	...	6	1·73	5	...
Diseases of the eye.																				
Ambeyopia and amaurosis	...	...	...	1	0·06	...	2	...	...	...	...	...	...	...	2	...	1	0·09	...	...
Anomalies of refraction	...	...	...	8	0·27	...	2	...	...	...	...	...	...	...	8	...	6	0·28	...	...
Blephritis	1	...	...	9	1.16	...	...	...	...	1	...	...	...	...	4	...	...	0·26	3	...
Conjunctivitis	3	...	...	108	3·70	...	...	...	...	27	...	4	...	...	682	...	...	18·66	694	...
Conjunctivitis granular (Trachoma)	...	...	...	3	0·40	...	...	...	...	...	...	...	...	...	158	...	6	9·02	64	...
Cataract	1	...	1	1	0·23	...	2	...	...	...	...	...	...	...	7	...	2	0·91	15	...
Glaucoma	...	...	...	1	0·08	...	...	...	...	...	...	...	...	...	...	...	...	...	5	..

Iritis	...	...	...	8	1·02	...	...	...	...	...	...	...	...	...	7	...	...	0·61	14	...
Keratitis	1	...	...	22	3·18	...	2	1	...	2	...	...	...	...	183	...	7	10·80	9	...
Retinitis	...	...	...	3	0·25	...	...	...	...	...	...	...	...	...	1	...	1	0·07	...	...
Other diseases of the eye	1	...	1	37	2·05	...	8	2	...	3	...	6	...	...	165	...	20	9·03	402	...
Diseases of the ear.																				
Inflammation of the external ear	5	...	...	184	5·02	...	...	2	...	7	...	1	...	...	112	...	...	2·88	141	...
Diseases of the middle ear	2	...	...	185	8·47	...	24	6	...	13	...	4	...	...	312	...	14	12·72	66	...
Diseases of the mastoid process	...	...	...	27	2·84	2	...	1	...	7	...	...	...	...	13	1	1	1·05	12	...
Other diseases of the ear	1	...	...	239	6·92	...	2	1	...	4	...	2	...	...	47	...	1	1·51	39	...
Diseases of the nose.																				
Diseases of the Mucous membrane	5	...	...	211	4·16	...	...	11	...	20	...	5	...	...	875	...	...	15·43	252	...
Diseases of the bone and cartilage	...	...	...	1	0·02	...	...	...	...	...	...	...	...	...	...	...	...	...	70	...
Other diseases of the nose	17	...	2	120	5·02	1	6	10	...	1	...	7	...	...	23	1	...	0·83	173	...
Diseases of the circulatory system.																				
Diseases of the Valves	2	1	...	33	3·17	...	16	5	...	2	1	...	...	...	17	1	12	1·59	3	1
Disordered Action of the Heart	1	...	1	162	9·54	4	11	12	2	3	1	5	...	...	35	5	8	2·29	4	4
Diseases of Blood vessels	12	1	3	68	4·54	...	5	11	...	...	...	4	...	1		2	2	1·47	149	52
Endocarditis	...	...	...	3	0·38	1	...	...	...	1	1	...	...	...	3	1	2	0·30	35	12
Myocarditis	1	...	...	2	0·19	...	1	...	...	...	...	2	1	...	1	..		0·38	9	1
Pericarditis	...	...	...	2	0·31	...	...	...	...	...	...	...	...	...			...	0·48	4	...
Other diseases of the Circulatory system	...	...	...	2	0·25	1	...	1	...	...	...	...	...	...	4	3	...	0·16	110	32
Diseases of the Blood and blood forming organs.																				
Anæmia primary	...	...	...	13	1·08	...	1	3	...	...	...	...	...	...	22	...	...	0·85		
Anæmia pernicious	...	...	...	1	0·10	1	...	...	...	...	...	...	...	...	14	1	1	1·49	581	52
Anæmia secondary	...	...	...	5	0·28	...	...	5	...	1	1	...	...	...	109	...	...	7·31		
Diseases of the spleen	...	...	...	6	0·26	...	...	...	...	...	...	...	...		42	1	3	1·39	100	2
Lymphadenitis	7	...	...	232	13·62	...	1	2	...	33	...	4	...		66	...	4	10·93	281	...
Lymphangitis	...	...	...	13	0·51	...	...	1	...	...	...	...	...		10	...	1	0·62	42	...
Other blood diseases	...	...	...	9	0·29	2	...	...	...	1	...	...	...		8	1	3	0·47	771	15

TABLE XXVI—*conid.*

Diseases.	European Army of India.										Indian Army.						Jail population of India. 152,060	
	British officers attached to European troops.			Men.			Women.		Children.		British officers attached to Indian troops.			Men present.				
	A.	D.	Invalids.	A.	Constantly sick.	D.	Invalids.	A.	D.	A.	D.	A.	D.	Invalids.	A.	D.	Invalids.	Constantly sick.	A.	D.
Diseases of Glands of internal Secretion.																				
Goitre	...	...	1	12	1·19	...	3	3	...	...	...	...	...	...	6	...	1	0·22	...	...
Hyperthyroidism	...	...	..	8	1·49	...	6	6	...	...	...	...	...	...	...	...	...	...	2	...
Other diseases	...	...	...	2	0·14	...	...	...	...	...		...	...	...	2	...	...	0·19	17	2
Diseases of the Breast.																				
Mastitis	...	...	...	9	0·37	...	...	15	...	...	...	...	...	...	4	...	...	0·11	2	...
Other diseases	...	...	...	1	0·04	...	...	1	...	...	...	...	...	...	...	...	...	...	9	...
Diseases of the Respiratory System.																				
Asthma	...	...	...	36	2.38	...	3	6	...	5	...	...	...	...	109	...	9	4·81	843	23
Bronchitis	15	...	1	744	25·91	...	8	36	...	129	1	16	...	2	1,551	8	7	53·47	3,247	15
Empyema	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...		...	...	3	1
Laryngitis	...	...	...	47	1·94	...	1	1	...	2		...	...	...	94	...	...	2·33	3	...
Pleurisy	1	...	...	113	8·34	...	...	6	...	2	...	...	...	...	219	2	13	18·62	249	13
Pneumonia:—																				
(*a*) Lobar	7	3	2	142	15·39	11	6	5	1	10	1	7	1	...	623	71	1	49·53	1,541	336
(*b*) Lobular (Bronchopneumonia)	2	2	...	56	6·09	4	1	5	...	35	2	...	...	...	107	18	...	8·11		
Other diseases	...	...	...	60	3·00	1	10	1	...	5	2	4	...	...	38	2	1	2·06	162	5
Diseases of the Teeth and Gums.																				
Caries of the enamel, dentine and cementum.	3	...	...	23	0·49	...	...	9	...	6	...	2	...	...	43	...	...	0·73	84	...
Gingivitis	2	...	...	28	0·75	...	...	1	...	4	...	...	...	...	127	...	...	2·81	52	...
Pyorrhoea alveolaris	4	...	...	60	1·74	...	...	10	...	3	...	4	...	...	84	...	3	2·39	44	2
Other diseases	...	...	...	24	0·44	...	...	1	...	4	...	2	...	...	4	...	...	0·10	310	...

Diseases of the Digestive System.																				
Appendicitis	21	1	...	389	27·74	2	2	38	...	24	1	20	1	3	132	1	2	8·97	68	5
Cholecystitis and cholangitis	5	...	...	25	1·49	...	2	4	...	1	...	4	...	...	11	...	...	0·93	10	1
Colic	2	...	1	151	3·07	...	...	12	...	1	...	1	...	...	150	...	...	3·25	688	2
Colitis	3	...	...	53	1·80	...	1	1	...	2	...	2	...	...	30	...	1	0·91	3,574	25
Constipation	7	...	...	323	6·95	...	...	41	...	60	...	4	...	...	487	...	1	8·14	313	...
Diarrhœa	52	...	1	842	20·25	...	...	42	...	124	...	27	...	...	933	...	...	20·69	2,938	35
Enteritis	4	...	...	39	1·00	...	...	2	...	52	10	1	...	...	34	...	...	0·97	288	17
Fistula in ano	2	...	...	19	1·81	...	...	1	...	...	...	3	...	...	46	...	1	3·15	45	...
Gastritis	15	...	...	289	10·50	...	2	21	...	12	1	10	...	1	111	...	...	3·52	120	4
Glossitis	...	...	...	...	...	...	...	...	...	...	...	...	...	...	9	...	...	0·21	4	...
Haemorrhoids (Piles)	5	...	...	200	7·80	...	...	...	...	...	...	11	...	...	263	...	...	12·99	565	2
Hepatitis acute	6	...	2	52	3·73	1	2	4	...	1	...	8	...	...	72	...	2	5·60	36	1
Hepatic abscess (Tropical abscess)	1	1	...	7	1·54	...	1	1	...	...	...	...	...	...	3	...	1	0·32	13	3
Hepatitis chronic (Cirrhosis)	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2	1	...	0·14	33	15
Hernia	8	...	...	116	9·15	...	2	1	...	8	1	3	...	...	67	...	5	5·72	87	2
Hypertrophy of the tonsils	...	...	...	72	2·10	...	...	6	...	46	...	...	...	...	8	...	...	0·39	...	...
Indigestion	8	...	...	146	4·35	...	...	18	...	29	...	8	...	...	478	...	1	11·79	905	1
Intestinal obstruction	...	...	1	3	0·31	1	1	...	...	1	1	...	...	...	1	1	...	0·09	15	10
Inflammation of the palate and pillars of the fauces	...	...	...	3	0·07	...	...	...	...	...	...	1	...	...	1	...	...	0·02	10	...
Jaundice	61	...	1	392	21·96	1	...	4	...	15	2	23	...	1	365	...	...	19·28	466	3
Pharyngitis	16	...	...	377	8·79	...	...	8	...	21	...	11	...	...	2,161	...	...	40·55	168	...
Peritonitis	2	...	...	3	0.38	...	...	5	...	2	1	1	...	...	4	1	1	0.17	4	2
Sprue	...	...	...	8	1.89	...	5	2	...	2	...	2	...	...	1	...	...	0.06	25	4
Stomatitis	3	...	...	7	0.17	...	...	1	...	7	...	...	...	...	25	...	...	0.77	109	...
Tonsillitis	38	...	...	1,777	43.26	1	...	69	...	194	...	37	...	1	707	...	...	16.71	223	1
Other diseases	18	...	1	377	19.15	3	8	22	...	13	2	19	...	4	151	4	8	8.68	730	25
Diseases due to disorders of Nutrition or of Metabolism.																				
Beri-beri	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2	...	...	0.55	16	...
Diabetes mellitus	...	...	...	2	0.21	...	1	3	1	...	...	...	...	...	7	...	2	0.85	20	2
Gout	1	...	...	1	0.03	...	...	...	...	...	...	1	...	...	1	...	...	0.09	5	...
Inanition	1	...	...	3	0.13	...	...	...	...	40	7	...	...	...	5	...	...	0·19	6	...
Rickets	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Scurvy	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	0·06	31	...
Other diseases	...	...	...	4	0.38	...	1	1	...	31	...	...	...	...	1	...	...	0·15	10	2
Diseases of the Male Organs of Generation.																				
Balanitis	...	...	...	91	2·60	...	...	...	...	1	...	...	...	...	8	...	...	0·17	...	...
Epididymitis	...	...	...	54	2·99	...	...	...	...	...	...	...	...	...	21	...	...	0·99	11	...
Hydrocele of tunica vaginalis	1	...	...	28	1·78	...	...	...	...	...	...	4	...	...	9	...	2	0·44	...	...
Hypertrophy of the prostate	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Orchitis	...	...	...	46	2·01	...	...	...	...	...	...	3	...	...	73	...	...	2·65	234	2
Paraphimosis	...	...	...	18	0·54	...	...	...	...	...	...	...	...	...	5	...	...	0·26	5	...

XXVI.—*contd.*

Diseases	European Army of India.										Indian Army.						Jail population India 152,060.	
	British officers attached to European troops.			Men.				Women.		Children.		British officers attached to Indian troops.			Men present.					
	A.	D.	Invalids	A.	Constantly sick.	D.	Invalids.	A.	D.	A.	D.	A.	D.	Invalids.	A.	D.	Invalids.	Constantly sick.	A.	D.
Diseases of the Male Organs of Generation—contd.																				
Phimosis	1	...	...	97	4·67	...	...	...	...	22	...	...	...	...	46	...	...	2·64	65	2
Prostatitis	...	...	...	4	0·15	...	...	...	...	...	...	...	...	...	5	...	...	0·20	11	1
Stricture of the urethra	...	...	...	2	0·07	...	...	...	...	...	...	...	...	...	3	...	...	0·24	24	...
Urethral fistula	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	6	...
Urethritis	...	...	...	235	11·04	...	...	...	...	...	...	...	...	...	84	...	1	3·84	10	...
Varicocele	...	...	...	50	2·67	...	...	...	...	...	...	...	...	...	9	...	...	0·43	...	...
Other diseases	1	...	...	15	0·74	...	1	...	...	1	...	...	...	...	16	...	...	1·55	245	1
Diseases of the Female Organs of Generation.																				
Abortion	...	...	...	...	...	...	...	130	...	...	...	...	...	...	...	...	...	...	12	...
Affection connected with pregnancy and Parturition and consequent on parturition	...	...	...	...	...	...	...	71	2	...	...	...	...	...	...	...	...	...	...	...
Diseases of the ovary	...	...	...	...	...	...	...	5	...	...	...	...	...	...	...	...	...	...	...	...
Diseases of the fallopian tube	...	...	...	...	...	...	...	3	...	...	...	...	...	...	...	...	...	...	...	...
Displacements and distortions of the uterus	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...
Dysmenorrhœa	...	...	...	...	...	...	...	6	...	1	...	...	...	...	...	...	...	...	1	...
Endometritis	...	...	...	...	...	...	...	16	...	...	...	...	...	...	...	...	...	...	24	...
Haemorrhage connected with parturition	...	...	...	...	...	...	...	9	...	...	...	...	...	...	...	...	...	...	...	...
Inflammation of vagina	...	...	...	...	...	...	...	5	...	...	...	...	...	...	...	...	...	...	...	...
Menorrhaegia	...	...	...	...	...	...	...	22	...	...	...	...	...	...	...	...	...	...	2	...
Metrorrhaegia	...	...	...	...	...	...	...	10	...	...	...	...	...	...	...	...	...	...	...	...
Pelvic peritonitis	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Other diseases peculiar to women	...	...	...	...	...	...	...	65	2	...	...	...	...	...	...	...	...	...	68	1

Diseases affecting Child—

Asphyxia of child	...	...	...	...	...	...	...	...	...	...	3	5	...	...	...	...	...	...	...	...	...	
Injury to child	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	
premature birth	...	...	...	...	...	...	...	...	...	...	2	4	...	...	...	...	...	...	...	...	...	
Still-birth	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
Diseases of Bones, Joints, Muscles, Fascia and Bursae.																						
Arthritis	2	...	...	30	4·26	2	12	1	...	1	...	2	...	...	34	1	8	3·31	93	...		
Diseases of the spine	...	...	...	5	0·31	...	5	...	...	...	...	...	...	...	9	...	2	1·21	19	...		
Flat foot	...	...	...	14	0·74	...	17	...	...	...	...	...	...	...	2	...	1	0·17	...	...		
Hammertoe	...	...	...	22	1·41	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...		
Myalgia	9	...	...	235	6·15	...	...	5	...	2	...	2	...	...	286	...	...	7·25	364	...		
Osteo-myelitis	...	...	...	18	3·47	...	3	1	...	...	...	1	...	...	14	...	5	1·94	1	...		
Periostitis	...	...	...	27	1·85	...	1	...	...	...	...	1	...	...	45	...	2	2·34	8	...		
Synovitis	5	...	...	490	19·41	...	5	2	...	...	...	7	...	...	455	...	8	23·04	221	4		
Other deformities of limbs	...	...	...	17	0·75	...	4	...	...	...	...	...	...	...	6	...	3	0·63	...	...		
Other diseases	13	...	...	416	28·91	...	22	19	...	3	...	8	...	...	321	...	25	17·28	200	2		
Diseases of the areolar tissue.																						
Boil	12	...	...	403	11·03	...	...	2	...	17	...	8	...	...	644	...	...	19·49	1,003	...		
Carbuncle	1	...	...	28	0·85	...	...	...	...	...	...	1	...	...	14	...	...	0·88	29	1		
Cellulitis	72	...	1	2,315	84·41	...	3	23	...	70	1	42	...	1	2,475	1	...	91·86	830	13		
Cellulitis suppurative (abscess).	5	...	...	163	6·88	...	1	8	...	6	...	5	...	...	445	...	2	18·63	2,504	4		
Other diseases	...	...	...	20	0·75	...	...	...	...	...	...	...	...	...	17	...	...	0·59	84	1		
Diseases of the Skin.																						
Acne	...	...	...	15	1·23	...	...	...	...	...	...	...	...	...	11	...	...	0·52	...	...		
Dermatitis	2	...	...	153	10·38	...	1	...	...	1	...	...	...	...	360	...	2	13·92	38	...		
Eczema	...	...	...	91	6·21	...	3	1	...	1	...	1	...	...	249	...	2	12·75	385	...		
Favus	...	...	...	1	0·02	...	...	...	...	...	...	...	...	...	1	...	...	0·06	...	...		
Herpes Zoster	3	...	...	38	1·23	...	...	...	...	...	...	2	...	...	70	...	...	2·66	55	...		
Impetigo	8	...	...	352	16·76	...	1	...	...	7	...	2	...	...	79	...	1	4·87	19	...		
Ingrowing toe nail	2	...	...	130	4·61	...	...	1	...	1	...	1	...	...	1	...	...	0·04	...	...		
Onychia	...	...	...	15	0·49	...	...	1	...	...	...	1	...	1	3	...	...	0·07	...	...		
Prickly heat	...	...	...	19	0·63	...	...	...	...	...	...	...	...	...	10	...	...	0·22	...	...		
Psoriasis	2	...	...	39	2·69	...	1	...	...	...	...	...	...	...	20	...	...	1·29	2	...		
Sycosis	...	...	...	17	1·05	...	...	...	...	...	...	...	...	...	25	...	...	1·26	...	...		
Tinea	2	...	...	339	11·23	...	...	...	...	...	...	...	...	...	210	...	...	7·56	...	...		
Urticaria	1	...	...	38	1·13	...	1	2	...	3	...	3	...	1	90	...	...	2·12	71	...		
Wart	...	...	...	47	3·43	...	...	...	...	...	...	...	...	...	12	...	...	0·58	...	...		
Whitlow	1	...	...	25	1·35	...	...	...	...	...	...	...	...	...	76	...	...	2·77	190	...		
Other diseases	3	...	...	99	5·18	...	3	2	...	1	...	...	...	...	59	...	...	2·66	1,939	4		

XXVI.—*concld.*

Diseases.	European Army of India.										Indian Army.						Jail population India. 152,060.	
	British Officers attached to European troops.			Men.			Women.		Children.		British Officers attached to Indian troops.			Men present.				
	A.	D.	Invalids.	A.	Constantly sick.	D. Invalids.	A.	D.	A.	D.	A.	D.	Invalids.	A.	D.	Invalids.	Constantly sick.	A. D.
Diseases of the Urinary Organs.																		
Calculus—																		
(*a*) Bladder	...	...	...	2	0·35	... ...	...	...	...	...	...	...	...	8	...	...	1·07	1 ...
(*b*) Kidney	...	...	1	16	1·44	1 4	5	...	...	...	1	...	...	15	2	1	1·46	5 ...
(*c*) Ureter	2	...	1	2	0·31	... ...	...	...	...	...	...	...	...	3	...	1	0·20	... ...
Cystitis	1	...	...	41	2·95	... ...	19	...	2	...	2	...	...	26	...	1	1·41	14 1
Haematuria	3	...	...	45	2·55	... 2	1	...	2	...	5	...	...	8	...	...	0·25	11 ...
Incontinence of urine	...	...	...	9	0·31	... 1	...	...	...	...	...	...	...	2	...	1	0·13	4 ...
Nephritis acute	1	...	...	9	0·89	3 2	3	...	2	...	2	1	...	27	2	13	2·41	103 13
Nephritis chronic	...	...	...	...	...	... ...	...	...	...	...	...	...	...	...	...	...	...	60 19
Other diseases	7	...	...	124	8·01	... 3	41	...	11	...	9	...	3	139	2	2	5.90	166 9
General Injuries.																		
Burns and scalds	..	..	..	..	..	.. ..	..	..	..	..	..	..	..	..	..	..	..	79 ..
Effects of anti-rabic treatment.	..	..	..	2	0·77	.. 1	..	..	..	..	..	..	..	2	..	..	0·07	.. ..
Effects of inoculation.	2	..	..	11	0·16	.. ..	..	..	..	..	1	..	..	12	..	..	0·29	.. ..
Heat exhaustion	..	..		89	2·22	2 1	..	..	1	..	..	..	..	48	3	..	0·76	8 ..
Heat stroke	..	..	..	20	0·61	9 ..	..	..	..	..	..	..	..	4	2	..	0·14	99 12
Sun stroke	..	..	..	..	..	.. ..	..	..	..	..	..	..	..	..	..	..	..	13 6
Other injuries	1	..	..	9	0·30	9 1	..	..	..	.. 2	.. ..	..	..	12	10	..	0·27	69 10
Local Injuries.																		
Abrasions	11	..	..	180	5·55	.. 1	..	..	..	..	5	..	..	218	..	..	6·42	87 ..
Burns and scalds	1	..	..	70	3·12	1 ..	2	..	20	1	..	..	..	182	2	1	8·24	177 ..
Concussions	22	..	1	63	3·67	..	1	..	1	..	6	..	..	32	1	1	1·40	

Contusions	34	..	..	710	21·81	..	..	3	..	11	..	14	..	..	1,808	3	...	60·44	424	..
Dislocations and displacements.	6	..	..	120	6·20	..	4	1	..	3	..	5	..	..	102	1	8	7·05	11	..
Fractures	28	1	4	694	53·73	7	21	6	..	32	1	30	2	7	1,057	9	77	96·06	241	9
Sprains and strains	22	..	..	1,060	33·14	..	..	..	..	5	..	12	..	..	636	..	..	20·27	101	1
Wounds gun-shot	1	..	1	35	2·93	5	7	..	..	..	..	3	2	1	23	3	6	2·60	3	..
Wounds others	17	..	2	292	11·88	..	1	1	..	15	1	12	..	..	1,556	2	6	58·14	1,876	26
Injuries self inflicted	..	1	..	15	1·23	12	..	..	1	..	..	..	1	..	1	2	1	0·03	..	5
Other injuries	3	..	..	74	4·23	4	1	..	..	1	..	3	..	..	53	3	2	3·27	553	16
Tumours and Cysts.																				
Carcinoma	1	..	..	3	0·46	1	2	4	1	..	..	1	..	..	1	1	..	0·28	..	..
Cysts	..	..	..	59	1·68	..	..	3	..	..	..	..	..	..	80	..	..	3·08	20	..
Sarcoma	..	..	..	2	0·24	..	1	..	..	..	..	..	..	..	2	..	..	0·21	1	..
New growths malignant (other cases).	..	..	..	1	0·19	..	1	..	..	..	..	..	..	..	5	..	1	0·32	27	2
New growths non-malignant	1	..	..	58	3·13	..	1	6	1	1	..	..	..	..	46	..	2	2·62	8	..
Malformations	..	..	1	10	0·84	..	..	2	..	5	3	..	..	..	4	..	2	0·37	1	..
Poisons																				
Alcohol	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Arsenic	..	..	..	1	0·01	1	..	..	..	..	..	..	..	..	5	1	..	0·27	..	..
Choloroform	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Other chemical poisons	..	..	..	3	0·09	1	..	..	..	..	..	..	..	..	3	1		0·09	1	..
Opium	..	..	..	1	0·02	..	..	..	..	..	..	..	..	..	1	2	..	0·00	34	3
Venom of insects	..	..	..	..	..	..	..	..	..	..	..	..	..	..	6	..	..	0·18	6	..
Venom of Ophidia (Snake bite).	..	..	..	4	0·17	..	..	..	..	..	..	..	..	..	7	..	..	0·37	13	..
Other poisons	..	..	..	..	..	..	..	..	..	..	..	..	..	..	3	1	..	0·07	45	3
No appreciable diseases	6	..	..	178	5·64	..	1	27	..	22	..	8	..	..	48	..	..	2·13	104	..
All other causes	1	..	..	25	1·88	..	1	..	..	2	..	..	..	..	2		..	0·30	74	
Total	1,031	15	42	33,528	1,476·69	134	506	1,368	14	1,887	74	737	10	35	60,063	281	668	2,011·00	85,119	1,743

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FOR 1934

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3. Map showing the distribution of plague mortality in India during 1934. (*Between pages* 38 and 39).

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CHARTS, GRAPHS, ETC.

1. Chart showing a comparison of birth, death and infantile mortality rates of British India with other countries in 1934. (*Facing page* 2).

2. Chart showing infantile mortality *per mille* of live-births in British India, England and Wales and British Dominions in 1934. (*Facing page* 20).

3. Diagram showing deaths by causes in 1934, compared with the decennial mean (1924—1933). (*Facing page* 28).

4. Graph showing the weekly numbers of deaths from cholera in India from the year 1929 to 1934 and map showing changes in the geographical distribution of cholera in India during 1933 and 1934 (cases reported per 100,000). (*Facing page* 34).

5. Chart showing plague deaths reported in Northern India by four-weekly periods, from July 1922 to December 1934. (*Facing page* 40).

6. Graph showing smallpox cases reported in India during the years 1930, 1931 and 1932, 1933 and 1934 (by four-weekly periods). (*Facing page* 48).

7. Vaccination graphs showing percentages of successful cases to total operations during 1934-35. (*Facing page* 168).

8. Plan of model installation for a sanitary disposal of refuse and human wastes. (*Facing page* 178.)

KEY
MAP OF INDIA
(SHOWING PROVINCES AND DISTRICTS).
REFERENCE
KASHMIR & JAMMU
PUNJAB
RAJPUTANA
BOMBAY
BIHAR & ORISSA
BENGAL
ASSAM
BURMA
NEPAL
BHUTAN
CHINA
AFGHANISTAN
BALUCHISTAN
BAY OF BENGAL
ARABIAN SEA
LACCADIVE ISLANDS
ANDAMAN ISLANDS
CEYLON
REFERENCES
Scale 1 Inch = 100 Miles.

Annual Report of the Public Health Commissioner with the Government of India for 1934.

VOLUME I.

SECTION I.

ON THE STATE OF THE PUBLIC HEALTH IN BRITISH INDIA AND SOME INDIAN STATES.

Introduction.

1. The principal statistical data for British India for the year 1934 are given below :—

Mid-year estimated population		275,753,570
Area (square miles)		890,116
Density per square mile		310
Births	Number	9,288,897
	Rate p. m.	34
Deaths	Number	6,856,244
	Rate p. m.	25
Infantile mortality per 1,000 live-births		187
Vital index		135·48

The year presented no markedly unusual features in regard to health conditions. The death rate is higher than last year and so is the infantile mortality rate, while the birth rate is lower, but such fluctuations in the recorded rates must be expected under our present system of registration and too much stress should not be laid on them. The natural increase of 9 *per mille* is well below the high figure of 14 recorded last year, but fluctuations in this figure also are a feature of India's statistics.

Mortality from the principal epidemic diseases has risen this year. Cholera deaths have been nearly three times what they were in 1933, plague mortality is almost doubled, but deaths from smallpox are low. The other principal causes of deaths show comparatively little change, although in the main the figures are higher, particularly under the heading " Fevers " where there is an increase of over 400,000 deaths.

In previous reports attention has been called to the population problem in India and to the gravity of the position which will have to be faced if the rate of increase recorded in the decade, 1921-31, continues without a counterbalance in the shape of increased food production. In the following paragraphs it is proposed to note some of the difficulties encountered in attempting to estimate the dangers ahead and to comment upon some factors which may possibly operate to prevent a critical position from arising.

Population, as enumerated at the census, is the only accurate piece of information we have in India on which to base any opinions as to vital statistics. As we move away from the census figures we find ourselves less and less certain of our data. Birth rates, death rates and the like are compiled from records which, as has repeatedly been pointed out in these reports, are known to be incomplete and inaccurate, and calculations based upon them must therefore admit of no small margin of error. The most that can be claimed is that the available data give some indication of actual conditions.

In no direction is our lack of accurate data more evident than in a consideration of the population problem particularly in its relation to food production. We count our population every ten years and can watch the increase which is alarming enough. Unfortunately we know much less about food production. Existing data are not accurate enough to estimate what India's food production really is.

Crop production is estimated by multiplying together " area in acres ", " standard yield " and " seasonal factor ". One might think that the area in acres should be accurately known but in fact in Bengal, Bihar and Orissa and Assam which have the system known as " permanent settlement " there is considerable uncertainty as to the accuracy of the area statistics while these figures for Indian States are of very doubtful value. Were it accurately known, the area in acres would be of great value, for this factor is relatively static except for increases due to new irrigation projects. The seasonal factor which varies from year to year, is mainly dependent upon meteorological conditions and cannot therefore be standardised. There remains the standard yield, the most elastic of the three, on which depends mainly the answer to the question " Can increased population be balanced by increased food production ". In dealing with this question there are several points to remember. Agricultural research is continuously showing the way to increased yields. There are areas under wheat yielding 14 *maunds* to the acre which could be made to yield double that amount. Apart from possible increases in standard yields there is a tendency to underestimate present yields. In a bad year standard yields are put down—they are seldom put up in a good year. Where figures can be checked, as in the case of cotton, estimates are found to be about 25 per cent. below the truth.

In the present state of our knowledge it is not safe positively to assert that food production cannot keep pace with population increase. Although there is evidence of widespread undernutrition in India there is no evidence to show that the " ryot " is worse fed now than he was in earlier days. Rather is it probable that the absorption of foodstuffs has, over a period of years, risen in proportion to the population. This cannot, however, be proved with our present statistics and there is a great need for a general survey of food production in India.

Until such a survey has been carried out, the question of population in relation to food supply cannot be satisfactorily determined.

Another factor which has a bearing on the population question is the relation of the birth and death rates. Among the many theories on this subject put forward by biologists and economists, and, working with data that are incomplete, the truth is not easy to discern. If the biological law holds good that the rate of reproduction is in direct proportion to the chances of death we at least know that the trend of our death rate is downwards. To those who believe that improved economic conditions or a rise in the standard of living will be followed by a drop in the birth rate there is some evidence that economic conditions are improving while, for those who hold that sooner or later increasing density will, by means which have not yet been satisfactorily demonstrated, lower fertility, there may be some consolation in the undoubted fact that population density is increasing in India.

One of the most important factors in connection with the birth rate is age at marriage. A rise in age at marriage especially in females will tend to reduce fertility and therefore to lower the birth rate. There is a considerable volume of opinion among those qualified to judge that the age of females at marriage is rising.

№ 1

A COMPARISON OF BIRTH, DEATH AND INFANTILE MORTALITY RATES OF INDIA WITH OTHER COUNTRIES IN 1934

If food production keeps pace with population increase, a critical situation may be avoided, but India needs more than this. A higher standard of living, with all that this brings in the way of improved health and welfare, is a pressing need which can only be obtained, in a predominantly agricultural country, by a considerable increase in food production or a pronounced drop in the annual increment of population.

In the chart facing page 2 and in Table I (*i*) the principal vital statistics for British India are compared with the corresponding figures of a number of other countries.

TABLE I (*i*).

Year 1934.	Birth rate per mille.	Death rate per mille.	Natural increase per mille.	Infantile death rate per 1,000 births.
British India	**33·7**	**24·8**	**8·9**	**187**
England and Wales	14·8	11·9	2·9	59
Scotland	18·0	12·9	5·1	78
Australia	16·4	9·3	7·1	44
New Zealand	16·5	8·5	8·0	32
Canada	20·4	9·4	11·0	72
Union of South Africa	23·4	9·7	13·8	62
Federated Malay States	35·4	21·4	14·0	163
Palestine	41·6	21·9	19·7	158
United States of America	17·1	11·0	6·1	60
Japan	30·0	18·1	11·9	125
Egypt	40·4	26·6	13·8	166

Population.

2. Tables I (*ii*) and I (*iii*) give the estimated mid-year population of British India by provinces and by sex and age.

TABLE I (*ii*).

Estimated population, 1934.

	Estimated population, 30th June 1933.	Excess of births over deaths.	Estimated population, 30th June 1934.	Percentage increase. March 1932 to March 1933.	Percentage increase. July 1933 to June 1934.	Percentage increase. Total from March, 1931, to June 1934.
British India	**272,613,830**	**3,139,740**	**275,753,570**	**1·4**	**1·2**	**3·8**
N.-W. F. P.	2,412,406	20,605	**2,433,011**	0·9	0·9	3·2
Punjab	24,352,693	330,715	**24,683,408**	1·7	1·4	5·2
Delhi	660,238	7,922	**668,160**	1·8	1·2	5·0
U. P.	49,665,337	894,060	**50,559,397**	1·7	1·8	4·4
B. & O.	38,627,495	422,534	**39,050,029**	1·5	1·1	3·6
Bengal	50,602,842	234,336	**50,837,178**	0·7	0·5	1·9
C. P.	16,008,088	229,619	**16,237,707**	1·9	1·4	4·6
Bombay	22,430,565	239,718	**22,670,283**	1·3	1·1	4·0
Madras	46,599,849	552,287	**47,152,136**	1·6	1·2	4·4
Coorg	164,133	54	**164,187**	0·3	0·0	0·5
Assam	8,119,934	77,671	**8,197,605**	1·2	1·0	3·4
Burma	12,401,694	123,962	**12,525,656**	1·2	1·0	3·4
Ajmer-Merwara	568,556	6,257	**574,813**	0·9	1·1	2·6

TABLE I (*iii*).

Estimated population by sex and age.

	Males.	Females.	Total.
All ages	**142,076,786**	**133,676,785**	**275,753,571**
0—5 years	20,327,711	20,627,782	40,955,493
5—10 ,, ...	18,621,490	16,855,397	35,476,887
10—15 ,, ...	17,098,806	14,997,130	32,095,936
15—20 ,, ...	12,951,089	12,856,930	25,808,019
20—30 ,, ...	24,718,550	24,572,717	49,291,267
30—40 ,, ...	20,358,747	18,135,648	38,494,395
40—50 ,, ...	13,989,575	12,222,993	26,212,568
50—60 ,, ...	8,357,520	7,757,665	16,115,185
60 years and upwards . .	5,653,298	5,650,523	11,303,821

In the report for 1933 it was stated that by 1941, at a conservative estimate, the population of India will probably considerably exceed a figure of 400 millions. Since then estimates have been made by Dr. Raja of the All-India Institute of Hygiene and Public Health, Calcutta, of the probable population of India in 1941 using three methods, and his results are given below :

(1) Assuming that the rate of increase in the period, 1921-31, will be repeated, the enumerated census population of 352,827,778 in 1931 will be 390,238,582 by 1941.

(2) The growth of population in a country is determined by four factors, the birth and death rates and the figures for immigration and emigration. Migration has ceased to be of any great importance in view of restrictions that have been placed on the admission of Indians into other countries. During the decade, 1921-31, the outward balance of migration was about a million and three quarters or only about 5 per cent. of the total increase of nearly 34 millions during these ten years. The birth rate in British India has been steady from the beginning of the century while the death rate has shown a tendency to decline during the past ten or twelve years. Using the specific mortality rates corrected for growth of population, it has been shown that the trend is downwards for both sexes at all age-periods except 60 and beyond, during the years 1921 to 1933. Persons aged 60 and over constitute only about 4 per cent. of the total population of the country and Dr. Raja therefore thinks that it is safe to assume that, at least in the immediate future, the lowered death rate is likely to persist. When growth is not characterised by violent fluctuations, short term predictions of sufficient accuracy can be obtained by the use of equations which have no justification except that they describe past events satisfactorily. To the figures for natural increase curves of increasingly higher order were fitted by Professor R. A. Fisher's method of fitting regression lines and, as it was seen that the straight line and second order parabola gave better fits than the immediately higher ones, the expected increases in population between 1931 and 1941, as given by these two curves, were calculated. On the assumption that the rate of increase in British India, to which alone

the figures related, was applicable to the whole of the country, Dr. Raja estimated the population in 1941 to be 401,422,517 as given by the straight line and 399,522,174 by the second order parabola.

(3) By fitting Professor Pearl's logistic curve to the enumerated populations of India for the census years 1872-1931, corrected for additions of territory and improvements in census methods. Taking 150 millions and 600 millions as the lower and upper limits, the logistic curve gives a very low rate of growth, *viz.*, 4·56% for the ten years 1931-41 and an expected population by 1941 of 368,922,362.

In considering the results of the three methods there can be little doubt that the prediction given by the logistic curve is a grave underestimate and that the figure of 400 millions mentioned in last year's report is, subject to abnormal visitations of epidemics or famines, likely to be near the mark.

Migration.—Following upon improved trade conditions the number of emigrants from Madras Presidency to Malaya rose from 38 in 1933 to 29,639 this year and those to Ceylon from 32,898 to 88,808. Immigrants from the same colonies numbered 4,189 exclusive of those who returned at their own expense. Immigrants to and emigrants from Burma by the sea-route numbered 256,004 and 226,698, respectively. In addition, large numbers of agricultural labourers crossed from Bengal to Arakan by the overland route. Coolies immigrating to Assam totalled 52,963.

Rainfall and other weather conditions.

3. Through the courtesy of the Director General of Observatories some of the important features are given below :—

Taking the year as a whole, rainfall was within 20% of normal over most of the country. In east Rajputana, west Central India, Berar and the west Central Provinces it was in excess by 21 to 34%, while in Kashmir and in the Madras Deccan it was in defect by 25% and 31% respectively.

During the cold weather period, January and February, rainfall was in moderate to large excess in Burma, Assam, Bengal and the Madras Presidency, normal in the United Provinces and Mysore, in slight defect in Bihar and Orissa and Central India and in moderate to large defect elsewhere. Over the plains of the country as a whole, the rainfall of this period was in defect by 10%.

The rainfall during the hot weather months, March to May, was in slight excess in Assam, normal in the Punjab and the North-West Frontier Province, in slight defect in Rajputana and in moderate to large defect elsewhere. Averaged over the plains of India, there was a defect of 27% in the season's rainfall.

No prolonged break in the monsoon occurred and the rainfall of the season, June to September, was fairly well distributed. It was in slight to moderate excess in Rajputana, Central India and the Central Provinces, in slight to moderate defect in Mysore and Madras Presidency and normal elsewhere. Over the plains as a whole, it was normal.

During the retreating southwest monsoon period, October to December, rainfall was in moderate to large excess in Assam and Bengal, normal in Burma, and Bombay Presidency outside Sind and Mysore, in large defect in the United Provinces and in slight to moderate defect elsewhere. On an average over the plains of the country, the rainfall of this period was normal.

TABLE I (*iv*).

Rainfall in inches.

	January and February.		March to May.		June to September.		October to December.		Total.	Departure from normal.
	Actual.	Normal.	Actual.	Normal.	Actual.	Normal.	Actual.	Normal.		
Mean of India .	**0·9**	**1·0**	**3·7**	**5·1**	**38·5**	**36·7**	**4·8**	**5·0**	**47·9**	**+0·1**
N. W. F. P. .	0·7	2·5	3·8	4·2	8·5	7·9	0·8	1·2	13·8	—2·0
Punjab . .	0·7	1·9	1·9	2·0	13·9	15·4	0·4	0·8	16·9	—3·2
U. P. . .	1·4	1·4	1·0	1·4	36·7	33·5	0·5	1·8	39·6	+1·5
B. & O. . .	1·2	1·5	1·3	4·1	43·8	42·7	3·1	3·9	49·4	—2·8
Bengal . .	1·8	1·3	8·5	12·7	49·5	54·4	8·1	6·0	67·9	—6·5
C. P. . .	0·1	1·3	0·3	1·7	50·2	40·5	2·4	2·8	53·0	+6·7
Bombay . .	0·1	0·2	0·6	1·5	42·5	39·7	3·3	3·4	46·5	+1·7
Madras . .	2·6	1·2	4·2	6·0	24·1	29·0	13·5	15·8	44·4	—7·6
Assam . .	3·8	2·2	30·3	25·1	71·9	66·1	11·8	7·1	117·3	+7·8
Burma . .	0·5	0·3	6·9	10·5	62·9	62·4	9·6	9·2	79·9	—2·5
Sind . .	0·0	0·5	0·2	0·5	6·5	5·9	0·1	0·2	6·8	—0·3
Rajputana .	0·2	0·6	0·7	0·9	24·9	19·0	0·4	0·8	26·2	+4·9
Central India .	0·6	0·8	0·4	0·9	44·6	33·1	1·1	1·6	46·7	+10·8
Hyderabad .	0·1	0·5	1·1	2·0	27·1	26·5	2·4	3·7	30·7	—2·0
Mysore . .	0·3	0·3	3·7	5·3	16·6	22·4	8·8	8·2	29·4	—6·8

Agricultural and Economic Conditions.

4. Table I (*v*) gives the cultivated and uncultivated acreage in British India and different provinces during the years 1933-34 and 1934-35. Those for the former year are revised totals.

TABLE I (*v*).

Area cultivated and uncultivated in each province.

		Cultivated.		Uncultivated.	
		Net area actually sown.	Current fallows.	Culturable waste other than fallow.	Not available for cultivation.
British India	1934-35	226,962,527	52,298,737	154,236,722	144,816,630
	1933-34	232,246,100	47,452,937	153,448,712	144,650,401
N.-W. F. P. .	1934-35	2,199,328	578,502	2,741,432	2,693,548
	1933-34	2,290,767	532,900	2,706,826	2,690,925
Punjab .	1934-35	26,504,016	4,619,933	14,215,656	12,862,386
	1933-34	28,682,946	2,450,469	14,203,373	12,862,158
Delhi .	1934-35	204,696	23,098	60,522	86,214
	1933-34	213,054	14,454	61,121	80,027
U. P. .	1934-35	35,662,051	2,910,102	10,217,742	9,900,572
	1933-34	36,010,072	2,494,740	10,279,727	9,901,333

Abbreviations—

N.-W. F. P.	North-West Frontier Province.	P. M. .	Per mille.
U. P. .	United Provinces of Agra and Oudh.	R. . .	Rural.
B. & O. .	Bihar and Orissa.	U. . .	Urban.
C. P. . .	Central Provinces and Berar.	M. . .	Male.
D.P.H. .	Director of Public Health.	F. . .	Female.

		Cultivated.		Uncultivated.	
		Net area actually sown.	Current fallows.	Culturable waste other than fallow.	Not available for cultivation.
B. & O.	1934-35	24,131,800	6,931,605	6,932,180	8,034,792
	1933-34	24,179,900	6,930,987	6,951,121	8,014,594
Bengal	1934-35	23,357,000	5,424,285	6,626,134	9,229,308
	1933-34	24,002,400	4,763,330	6,255,188	8,920,219
C. P.	1934-35	24,668,067	3,988,965	14,209,929	4,949,650
	1933-34	24,988,652	3,773,525	14,107,740	4,946,445
Bombay	1934-35	32,801,971	10,717,834	6,665,962	19,477,464
	1933-34	33,245,929	10,263,999	6,584,789	19,522,658
Madras	1934-35	32,830,795	11,165,719	13,442,650	19,792,886
	1933-34	33,879,523	10,375,409	13,180,616	19,878,901
Coorg	1934-35	137,421	171,919	11,690	334,045
	1933-34	137,560	171,780	11,690	334,045
Assam	1934-35	5,971,697	1,823,513	19,136,779	4,571,030
	1933-34	6,026,569	1,869,163	19,070,364	4,571,030
Burma.	1934-35	18,164,499	3,799,494	59,679,265	51,996,340
	1933-34	18,239,159	3,651,288	59,755,221	52,045,325
Ajmer-Merwara.	1934-35	359,186	143,777	276,781	894,395
	1933-34	349,569	160,893	280,936	882,741

Table I (*vi*) gives the areas in acres under food crops in the major provinces. Figures for minor administrations are not available.

TABLE I (*vi*).

	1934-35
Total	**202,627,395**
N.-W. F. P.	2,240,421
Punjab	20,878,521
U. P.	37,567,865
B. & O.	25,935,100
Bengal.	22,626,900
C. P.	20,371,556
Bombay*	24,331,068
Madras	29,761,120
Assam	5,099,385
Burma	13,815,459

*For the year, 1933-34.

Additional information extracted from provincial season and crop reports for 1934-35 is included in the following sub-paragraphs.

N. W. F. P.—The area sown aggregated 2,554,798 acres or 4% less than in 1933-34 and 3% less than the normal ; that harvested amounted to 2,127,597 which was 6% more than in 1933-34 and slightly in excess of the mean, the balance failing to mature. The total estimated produce of rice was 19,469 tons, 12% above normal ; *jowar* 9,506 tons or 34% below normal ; *bajra* 13,584 tons or 57% below normal ; maize 212,691 tons, 5% below normal ; cotton 2,711 tons, 51% below normal ; wheat 237,782 tons, 3% above normal ; barley 40,523 tons, 59% below normal ; gram 28,975 tons, 26% below normal ; and rapeseed 8,649 tons, 55% below normal. Compared with normal, prices of food grains continued low and consequently the condition of the agricultural population was not prosperous. Stocks of foodgrains and fodder were generally sufficient.

Punjab.—Compared with the previous year, both the sown and the matured areas, 29,833,330 acres and 25,235,439 acres, were reduced by 14% and 12%, the *rabi* harvests suffering mainly ; the balance of 4,597,891 acres failed to yield harvests. Sown and matured areas were lower than the decennial averages by 4% and 1% respectively ; those under cereals and pulses by nearly 18% while areas under fodder crops (4,841,920 acres) rose by 2%.

The total estimated outturn of rice was 448,000 tons or 2% better than normal ; wheat 3,042,400 tons or 4% above normal ; barley 167,800 tons or 25% below normal ; *jowar* 102,300 tons or 2% above normal ; *bajra* 354,700 tons or 1% above normal ; maize 411,600 tons or 15% above normal ; and gram 798,300 tons or 26% below normal.

Prices generally showed a slight upward tendency. Stocks of food grains were generally sufficient.

The fall in water levels continued in the districts of Jullundur and Hoshiarpur. Continued deterioration due to hill torrents was reported in parts of Ambala and Jhelum districts.

Bihar and Orissa.—The harvested area totalled 29,547,400 acres, *bhadoi* crops occupying 7,567,100 acres, *aghani* 11,002,900 acres, *rabi* 10,396,100 acres, fruits and vegetables 581,300 acres. Of this total, 5,415,600 acres were sown more than once, and excluding these the net area sown amounted to 24,131,800 acres, of which 5,102,378 acres were irrigated. The gross outturn of winter rice of *bhadoi* crops was estimated at 3,750,700 tons, autumn rice 923,900 tons, maize 467,900, wheat 505,100, barley 570,100, gram 494,900; sugarcane 673,200 tons, jute 42,500 (bales) and rape and mustard 137,400 tons.

The *rabi* crops, which were 91% of the decennial average, totalled 505,100 tons of wheat or 97% of normal. Spring oilseeds 272,200 tons or 91% of normal, castor 7,700 tons or 90% of normal and summer rice, gram and barley, etc., 3,420,500 tons or 90% of normal. The cotton crop which was fair to good, was estimated to yield an outturn of 8,143 bales, or 1% more than in 1933-34. The gross outturn of the *aghani* crop was estimated at 99% of the average.

Prices of food-grains ruled higher, stocks being generally sufficient. The condition of the agricultural population was on the whole satisfactory. Owing to the prevailing trade depression the demand for labour was less except in the North Behar districts where it increased on account of house reconstruction work following the earthquake.

Bengal.—The net cropped area totalled 23,357,100 acres or 3,478,200 acres less than the normal ; a total of 4,564,200 acres was cropped more than once.

The area under food-grains, amounting to 22,382,400 acres, was 14% less than normal and included 20,739,700 acres under rice, 206,900 acres under grain, 154,700 acres under wheat, 91,300 under barley and 75,200 under maize. The areas under linseeds and fibres were also lower than normal by 27% and 8% respectively. Those under sugar crops increased from 329,600 to 585,900 acres and those under drugs including narcotics from 511,200 to 980,200 acres.

The *bhadoi* crops estimated at 73% of the normal (79% in 1933) comprised jute 7,143,400 bales of 400 lbs. ; winter rice 85% of normal ; sugarcane 86% of normal ; *rabi* crops 85% of normal and cotton 23,758 bales.

Although the prices of staple food-grains rose a little higher than in 1933, rural indebtedness was reported on the increase owing to the continued general low prices of agricultural produce. Wages remained much the same as in 1933.

Central Provinces and Berar.—The total area amounted to 38,575,850 acres in the C. P. proper and 11,377,694 acres in Berar. In the Central Provinces 23,889,918 acres or 48% and in Berar 8,317,097 acres or 26% were occupied for cultivation, but the area actually under crops was only 18,008,892 acres in the Central Provinces proper and 6,659,175 acres in Berar, the remaining areas failing to yield crops for various reasons. In the whole province, rice harvests (5,631,074 acres) yielded an outturn of 1,757,400 tons or 699 lbs. per acre as against a standard outturn of 648 lbs. per acre of cleaned rice. The *juar* and *tur* harvests (4,458,345 acres) aggregated 1,065,000 tons as against 1,114,800 in 1933-34 ; cotton (4,288,947 acres) 609,200 bales as against 732,700 in 1933-34 ; and *til* (337,912 acres) 19,900 tons as against 43,100 in the previous year.

Due to a rise in prices of certain commodities, the total estimated value of crops, which were 82% of the normal, rose by 3½ crores of rupees as compared with the previous year.

Bombay Presidency (1933-34).—In the Presidency proper, whilst the gross cropped area rose to 29,192,000 acres or by 0·1% chiefly in Gujarat and Deccan, the net cropped area declined from 28,281,000 acres to 28,227,000 acres due to a great decrease of 118,000 acres in the Karnatak. The area under food crops (20,302,000 acres), *i.e.*, cereals, pulses, sugar cane, fruits and vegetables, increased by 91,000 acres or 0·5% over 1932-33 and by 578,000 acres or by 2·9% as compared with the average ; that under non-food crops comprising cotton, tobacco and oil seeds, fell by 54,000 acres or 0·6% as compared with 1932-33 and rose by 332,000 acres or 3·9% over the normal. The estimated yields of the principal food crops were—*bajri* 467,801 tons ; *ragi* 216,372 tons ; rice 901,744 tons ; wheat 328,468 tons ; *jowari* 1,528,236 tons ; other cereals 262,810 tons and pulses 508,543 tons.

In Sind both the gross and net cropped areas, 5,513,000 acres and 5,019,000 acres, increased by 5·9% and 6·2% respectively over the previous year due to the satisfactory working of the Barrage canal system. The increase occurred chiefly in areas under better paying crops like cotton (+52%), rice (+0·9%), wheat (+34·7%), gram (+7·4%), etc. The outturns of food crops which aggregated 1,065,509 tons included rice 461,534 tons, wheat 303,249 tons, *jowari* 105,815 tons, *bajri* 106,256 tons, and other cereals 7,176 tons and pulses 81,479 tons.

There was scarcely any improvement in prices, and slump conditions which commenced 4 years ago continued to operate adversely.

Madras Presidency.—The sown area (37,538,510 acres) was among the lowest reported since 1924-25 ; food crops occupying 29,761,120 acres or 79% of the total ; and non-food crops 7,777,390 acres or 21%. The most important food crop was rice which occupied 11,055,587 acres or 3% less than the normal ; other important food crops included cholam 5,142,734 acres or 7% above normal, cumbu 2,697,189, ragi 2,156,752, Korra 1,498,441, and varagu 1,014,174 acres.

For the Presidency as a whole, the yield of crops per acre was below normal, that of tobacco and sugar cane was 98% of the normal, of rice (7,434,450 tons) 96%, cotton (474,980 bales) 94%, ragi (938,030 tons) 93%, whilst in the case of cholam (1,275,560 tons), cumbu (627,300 tons), varagu (345,980 tons), samai (111,450 tons), maize (28,610 tons), horsegram (121,990 tons), and gingelly (78,640 tons) the outturn was 82%—90% of the normal.

The stocks of food grains and fodder were generally sufficient. The prices of food-grains and money crops were generally higher than in 1933-34 but not enough to improve the economic condition of the agricultural population substantially.

Assam.—The area sown aggregated 5,971,697 acres and included 5,099,385 acres or over 85% under food crops ; 375,991 acres under oilseeds ; 444,427 acres under drugs and narcotics and the rest under sugar, fibres, fodder crops, fruits and vegetables, etc. The outturns of principal crops were rice 1,481,300 tons, jute 303,900 bales, tea 103,800 tons, rape and mustard 54,200 tons, and sugar cane 35,000 tons. Wholesale prices were lower this year.

Burma.—Compared with 1933-34 the gross harvested area aggregating 18,066,045 acres diminished by 166,809, due mainly to low prices and insufficiency or early rains. Important decreases occurred under rice chiefly in Upper Burma (—232,511 acres) and sesamum (—190,477 acres) ; the areas under these two crops totalled 12,009,717 acres and 1,418,931 acres, respectively. Other crops mainly consisted of millet 597,322 acres, maize 218,185, gram 215,808 acres, *pegyi* 145,040 acres, *pebyugale* 125,509 acres, *pesingon* 186,766 acres, ground nuts 624,558 acres, condiments and spices 156,146 acres, sugar crops 58,393 acres and cotton 442,203 acres.

The outturn of rice aggregated 6,471,818 tons or 13% less than in the previous year ; that of sesamum 53,500 tons of seed ; cotton 16,500 tons and ground nuts 142,000 tons.

Prices ruled easier than in the preceding year ; rubber restriction has resulted in the reopening of some rubber estates and good prices obtained for tin and wolfram have reduced employment in Tavoy and Mergui.

Famine conditions and their relief.

5. An outbreak of famine was reported in the districts of Anantapur and Bellary in Madras Presidency and relief works were carried out in these areas. Scarcity conditions prevailed in the districts of Bankura, Murshidabad, Birbhum and Tippera in Bengal and the situation was met by the opening of test relief works, distribution of gratuitous relief, loans, etc. Some provinces, especially Bengal, Assam and B. & O. suffered from floods ; special grants aggregating to Rs. 1,25,000, Rs. 25,000 and Rs. 30,000, respectively, were

distributed in these three provinces for the relief of the distressed from the funds of the Indian People's Famine Trust.

Live-births.

6. *British India.*—Live-births registered during 1934 numbered 9,288,897 being 4% less than the figure of 1933 and 3% more than the quinquennial mean (9,025,065). The crude birth rate was 33·7 p. m. of total estimated population, as against 35·5 p. m. in 1933 and 35 p. m., the quinquennial mean. Including still-births, the rate was 34·3 p. m.

Compared with 1933, the Punjab recorded a decrease of 103,994 births or of 10%, United Provinces 119,742 or 7%, Bihar and Orissa 78,618 or 6% and Madras 70,249 or 4% ; in Delhi, Bengal, Bombay, Assam and Ajmer-Merwara the reductions were inconsiderable. Small increases occurred in North-West Frontier Province, Central Provinces, Burma and Coorg. Table I (*vii*) gives the registered numbers and rates *per mille* according to sex for British India and the various provinces, Central Provinces recording the highest and Coorg, for oft repeated reasons, the lowest birth rate.

TABLE I (*vii*).

	Births.			Rate per *mille*.				Mean (1929-33.)		
	M.	F.	Total.	M.	F.	Total.		M.	F.	Total.
						1934.	1933.			
British India	**4,827,379**	**4,461,518**	**9,288,897**	**17·5**	**16·1**	**34**	**36**	**18**	**17**	**35**
N.-W.F. P.	41,004	31,713	72,717	17	13	30	29	16	12	28
Punjab	495,767	442,863	938,630	20	18	38	43	22	19	41
Delhi	12,750	11,885	24,635	19	18	37	44	24	22	46
U. P.	941,838	836,954	1,778,792	19	17	35	38	19	17	36
B. & O.	652,829	615,501	1,268,330	17	16	32	35	17	17	34
Bengal	759,722	704,798	1,464,520	15	14	29	29	14	13	27
C. P.	357,503	337,216	694,719	22	21	43	43	23	22	45
Bombay	404,571	375,950	780,521	18	17	34	35	19	18	37
Madras	836,444	797,552	1,633,996	18	17	35	37	19	18	37
Coorg.	2,134	1,984	4,118	13	12	25	25	12	11	23
Assam	125,740	117,016	242,756	15	14	30	30	15	14	29
Burma	186,503	179,225	365,728	15	14	29	29	14	14	28
Ajmer-Merwara	10,574	8,861	19,435	18	16	34	38	18	15	33

Table I (*viii*) gives the total births and the relative rural and urban rates for British India and for each province. The rural rate continued to exceed the urban in the Punjab (+6 p. m.), B. & O. (+13 p. m.), Bengal (+8 p. m.), Bombay (+2 p. m.) and Madras (+15 p. m.) ; in other provinces it was lower. The high rural rates in B. & O. and Bengal are mainly due to the fact that a large proportion of the rural population, who have migrated to urban centres, return to their rural homes for child-birth.

TABLE I (*viii*).

	Births.		Rate p.m.	
	Rural.	Urban.	Rural.	Urban.
British India	**8,364,513**	**924,384**	**34**	**34**
N.-W. F. P.	63,084	9,633	30	30
Punjab	829,652	108,978	39	33
Delhi	7,245	17,390	35	38
U. P.	1,602,627	176,165	34	45
B. & O.	1,238,757	29,573	33	20
Bengal	1,391,494	73,026	29	21
C. P.	619,439	75,280	43	43
Bombay	636,628	143,893	35	33
Madras	1,402,447	231,549	34	36
Coorg	3,727	391	24	41
Assam	236,497	6,259	29	31
Burma	319,968	45,760	29	32
Ajmer-Merwara	12,948	6,487	34	36

Birth rates for the chief communities are available for ten provinces and are given in Table I (*ix*). The birth rate of 219 p. m. for "other classes" in N. W. F. P., which is incredible, is ascribed to misclassification in registering births on the part of Municipal Committees and Cantonment authorities in Peshawar district.

TABLE I (*ix*).

	Hindus.	Muhammedans.	Christians.	Other classes.
N.-W. F. P.	28	31	31	219
Delhi	37	43	21	39
U. P.	37	37	10	17
B. & O.	34	33	21	20
Bengal	28	29	20	75
C. P.	40	41	19	91
Madras	36	38	33	36
Coorg	26	19	20	51
Burma	17	28	23	31
Ajmer-Merwara	35	34	7	9

The crude birth rate or ratio of recorded births to an estimated population of all ages, as shown in Table I (*x*) is the best indication at our disposal of reproduction and, in conjunction with the recorded death rate, of the natural increase. Unfortunately the number of married women of reproductive age is not recorded and therefore not available.

Birth rates have however been calculated on the basis of the estimated number of women of child-bearing age, taken as 15—40 years, and these ratios are shown in Table I (*x*). This period of 15—40 years is possibly pitched too high, particularly for the southern half of India, but it is probably correct in indicating a child-bearing period 5 years shorter than the European one.

TABLE I (*x*).

	Female population, 15-40 years.	Total births.	Rate p.m.
British India	**55,555,774**	**9,288,897**	**167**
N. W. F. P.	465,380	72,717	156
Punjab	4,361,897	938,630	215
Delhi	125,041	24,635	197
U. P.	9,917,198	1,778,792	179
B. & O.	8,068,439	1,268,330	157
Bengal	10,535,972	1,464,520	139
C. P.	3,321,361	694,719	209
Bombay	4,518,284	780,521	172
Madras	9,980,831	1,633,996	163
Coorg	33,293	4,118	123
Assam	1,583,743	242,756	153
Burma	2,532,658	365,728	144
Ajmer-Merwara	111,677	19,435	174

For purposes of comparison, the crude birth rates in British India and those of a number of other countries are given in Table I (*xi*).

TABLE I (*xi*).

	Quinquennial.		Annual.				
	1921-25.	1926-30.	1930.	1931.	1932.	1933.	1934.
British India	**33·4**	**35·7**	**36·0**	**34·3**	**33·7**	**35·5**	**33·7**
England and Wales	19·9	16·7	16·3	15·8	15·3	14·4	14·8
Scotland	23·0	19·9	19·6	19·0	18·6	17·6	18·0
Belgium	20·4	18·6	18·8	18·3	17·7	16·5	16·0
Czechoslovakia	27·1	23·2	22·7	21·5	21·0	19·2	18·8
Denmark	22·3	19·4	18·7	18·0	18·0	17·3	17·8
France	19·3	18·2	18·0	17·4	17·3	16·3	16·1
Germany	22·1	18·4	17·5	16·0	15·1	14·7	18·0
Hungary	29·4	26·0	25·4	23·7	23·4	21·6	21·4
Italy	29·7	26·8	26·7	24·9	23·8	23·5	23·2
Netherlands	25·7	23·2	23·1	22·0	22·0	20·8	20·7
Norway	22·2	18·0	17·0	16·3	16·3	14·9	14·8
Portugal	33·2	31·2	29·8	29·7	29·9	29·0	28·4
Roumania	37·9	35·2	35·0	33·3	35·9	32·0	32·4
Spain	29·8	28·5	28·2	27·4	28·1	27·6	26·2
Sweden	19·1	15·9	15·4	14·8	14·5	13·7	13·7
Switzerland	19·5	17·6	17·2	16·7	16·7	16·4	16·2
Canada	27·4	24·1	23·9	23·2	22·4	20·9	20·4
New Zealand	22·2	19·7	18·8	18·4	17·1	16·6	16·5
South Africa (White)	27·1	26·1	26·4	25·4	24·3	23·0	23·5
U. S. A.	22·5	19·7	18·9	17·8	17·4	16·6	17·1
Japan	34·6	33·5	32·4	32·2	32·9	31·0	30·
Egypt	43·0	44·4	45·7	44·8	42·9	44·1	40·

In the Punjab the district birth rates varied between 47 p.m. and 27 p.m., the highest rates being registered in the districts of Gurdaspur, Jullundur, Amritsar, Sialkot and Ambala in the north and east and the lowest in Multan, Jhang, Muzaffargarh and D. G. Khan in the south and south west and in Attock. In the U. P. the ratios vary between 48 p. m. and 25 p. m. ; in B. & O. 45 p. m. and 26 p. m. ; in Bengal 37 p. m. and 21 p. m. ; C. P. 51 p. m. and 37 p. m. ; Bombay 50 p. m. and 14 p. m. ; Madras 44 p. m. and 28 p. m. ; Assam 35 p. m. and 18 p. m. ; and Burma 41 p. m. and 18 p. m.

Natural increases accruing from the excess of births over deaths for decennial periods from 1871 to 1930 and for individual years from 1927 to 1934 are given in Table I (*xii*).

TABLE I (*xii*).

	Annual number of births.	Birth rate p.m.	Annual number of deaths.	Death rate p.m.	Annual excess of births over deaths.
1871—1880 . . .	Not available.		3,540,202	20	..
1881—1890 . . .	4,565,687	24	5,058,578	26	—492,891
1891—1900 . . .	7,174,694	34	6,662,417	31	512,277
1901—1910 . . .	8,591,136	38	7,657,513	34	933,623
1911—1920 . . .	8,810,018	37	8,142,364	34	667,654
1921—1930 . . .	8,345,364	35	6,347,063	26	1,995,301
1927	8,516,706	35	6,009,729	25	2,506,977
1928	8,882,573	37	6,180,114	26	2,702,459
1929	8,565,341	36	6,267,391	26	2,297,950
1930	8,690,714	36	6,483,449	27	2,207,265
1931	9,135,890	35	6,615,099	25	2,520,791
1932	9,054,506	34	5,805,666	22	3,248,840
1933	9,673,876	36	6,096,787	22	3,582,089
1934	**9,288,897**	**34**	**6,856,244**	**25**	**2,432,653**

Table I (*xiii*) gives births by quarters of the year ; as usual, the largest number was recorded in the fourth and the lowest in the second quarter.

TABLE I (*xiii*).

	1st Quarter.	2nd Quarter.	3rd Quarter.	4th Quarter.
British India	**2,354,807**	**2,100,575**	**2,272,544**	**2,560,981**
N.-W. F. P.	20,387	16,861	16,567	18,902
Punjab	250,424	188,648	211,113	288,445
Delhi	6,193	4,583	5,779	8,080
U. P.	457,495	397,534	466,246	457,517
B. & O.	313,748	304,971	310,089	339,522
Bengal	430,640	307,987	260,543	465,350
C. P.	164,409	160,099	191,743	178,468
Bombay	189,239	180,703	205,540	205,039
Madras	361,092	396,183	453,128	423,593
Coorg	1,020	1,098	1,120	880
Assam	70,322	46,905	50,868	74,661
Burma	85,169	90,827	94,987	94,745
Ajmer-Merwara	4,669	4,166	4,821	5,779

Table I (*xiv*) gives the proportion of male to female births for provinces and for British India as a whole. The excess of males over females born is a constant feature.

TABLE I (*xiv*).

	Males born per 100 females.		
	1934.	1933.	1929-33.
British India	**108**	**108**	**108**
N.-W. F. P.	129	130	130
Punjab	112	112	112
Delhi	107	107	108
U. P.	113	113	112
B. & O.	106	105	104
Bengal	108	107	108
C. P.	106	106	105
Bombay	108	108	108
Madras	105	105	105
Coorg	108	106	107
Assam	107	106	106
Burma	104	104	105
Ajmer-Merwara	119	113	116

Births exceeded deaths by 506,827 in Madras Presidency ; 483,698 in U. P. ; 288,855 in Punjab ; 287,633 in Bengal ; 286,731 in B. & O. ; 226,210 in Bombay Presidency ; 117,584 in C. P. ; 116,181 in Burma ; 87,055 in Assam ; 23,052 in N. W. F. P., and by 8,827 in Delhi, Ajmer-Merwara and Coorg. As usual, the birth rate exceeded the death rate in every province, the largest differences being recorded in the Punjab (+12 p. m.), Madras (+11), Assam (+11), N. W. F. P. (+10), Bombay (+10), U. P. (+9) and Burma (+9).

Deaths.

7. *British India.*—Compared with 1933 and the quinquennial mean, the registered deaths, 6,856,244, showed an increase of 759,457 or over 12% and of 1,596,566 or 30%, respectively. The death rate of 24·9 p. m. increased by roughly 3 *per mille* over the rate for 1933 and by 1 *per mille* over the 5-year mean. These figures reflect the relative unhealthiness of the year under report, particularly in B. & O., C. P., and U. P., where the rates exceeded those for 1933 by 13 p. m., 10 p. m. and 8 p. m., respectively. Slightly higher mortality was returned also in Madras, Burma and Ajmer-Merwara. Female mortality exceeded male mortality in the C. P., (+3 p. m.), B. & O. (+2 p. m.), N. W. F. P. (+1 p. m.), U. P. (+1 p. m.), Madras (+1 p. m.) and Burma (+1 p. m.). Table I (*xv*) gives registered deaths and the rates *per mille* according to sex for British India and for the various provinces.

TABLE I (*xv*).

	Deaths.			Rate p.m.				Mean (1929-33).		
	M.	F.	Total.	M.	F.	Total.		M.	F	Total.
						1934.	1933.			
British India .	**3,570,543**	**3,285,701**	**6,856,244**	**25·1**	**24·6**	**24·9**	**22·4**	**24**	**23**	**24**
N.-W. F. P. .	27,389	22,276	49,665	21	20	20	21	21	20	21
Punjab . .	346,156	303,619	649,775	26	27	26	27	25	27	26
Delhi .	10,039	9,020	19,059	26	32	29	32	25	33	29
U. P. . .	684,543	610,551	1,295,094	26	25	26	18	24	23	24
B. & O. . .	509,759	471,840	981,599	26	24	25	22	25	23	24
Bengal . .	610,731	566,156	1,176,887	23	23	23	24	22	22	22
C. P. . .	302,031	275,104	577,135	37	34	36	26	34	30	32
Bombay . .	285,713	268,598	554,311	24	25	24	24	26	27	26
Madras . .	570,915	556,254	1,127,169	24	23	24	23	25	24	24
Coorg . .	1,906	1,890	3,796	21	26	23	24	13	11	24
Assam . .	81,947	73,754	155,701	19	19	19	20	19	19	19
Burma . .	130,725	118,822	249,547	20	19	20	18	20	9	19
Ajmer-Merwara	8,689	7,817	16,506	29	29	29	28	26	26	26

From Table II (*i*) on page 28 it will be apparent that, smallpox excepted, all the chief groups of diseases, under which deaths are registered, showed increased mortality during the year, notably the fevers group (+426,778 deaths), cholera (+131,390) and "other causes" (+104,843). Health conditions for the rural population were especially unfavourable owing to the greater prevalence of fevers and cholera among them. The death rates exceeded those for urban areas by 9 p. m. in Delhi, 8 p. m. each in Bihar and Orissa and Madras, 7 p. m. in Punjab, 4 p. m. in Ajmer-Merwara, 3 p. m. in North-West Frontier Province, 2 p. m. each in Bengal and Assam and 1 p. m. in Central Provinces. Table I (*xvi*) gives the recorded deaths and rates *per mille* in rural and urban areas in British India and in the provinces.

TABLE I (*xvi*).

	Deaths.		Death rate p. m.		Mean (1929-33).	
	R.	U.	R.	U.	R.	U.
British India	**6,192,544**	**663,700**	**24·9**	**24·4**	**24**	**27**
N. W. F. P.	43,758	5,907	21	18	22	21
Punjab	582,821	66,954	27	20	27	22
Delhi	7,235	11,824	35	26	38	27
U. P.	1,147,253	147,841	25	38	23	36
B. & O.	956,519	25,080	25	17	26	17
Bengal	1,104,087	72,800	23	21	22	20
C. P.	516,615	60,520	36	35	37	36
Bombay	443,048	111,263	24	26	25	26
Madras	1,017,966	109,203	25	17	24	27
Coorg	3,385	411	22	43	22	42
Assam	152,246	3,455	19	17	19	17
Burma	207,125	42,422	19	30	30	19
Ajmer-Merwara	10,486	6,020	27	23	30	34

Seasonal incidence of mortality is given in Tables (G.—J.) on pages 289—91. Registered deaths in the 2nd half of the year were 18% more than those in the first half, the maxima being reached in six provinces in December, in three in August and September.

For purposes of comparison, the death rates in British India and those of a number of countries are given in Table I (*xvii*).

TABLE I (*xvii*).

	Quinquennial.		Annual.				
	1921-25.	1926-30.	1930.	1931.	1932.	1933.	1934.
British India	**27·5**	**26·0**	**26·8**	**24·9**	**21·6**	**22·4**	**24·9**
England and Wales	12·2	12·1	11·4	12·3	12·0	12·3	11·8
Scotland	13·9	13·6	13·3	13·3	13·5	13·2	12·9
Belgium	13·4	13·7	13·3	13·3	13·2	13·1	12·2
Czechoslovakia	16·1	15·3	14·1	14·4	14·1	13·7	13·2
Denmark	11·3	11·1	10·8	11·4	11·0	10·6	10·4
France	17·2	16·8	15·6	16·3	15·8	15·8	15·1
Germany	13·3	11·8	11·1	11·2	10·8	11·2	10·9
Hungary	19·9	17·0	15·5	16·6	17·8	14·7	14·4
Italy	17·3	16·0	14·1	14·8	14·6	13·5	13·1
Netherlands	10·4	9·9	9·1	9·6	9·0	8·8	8·4
Norway	11·5	11·0	10·6	10·9	10·7	10·2	9·8
Portugal	20·4	18·4	17·1	16·8	17·1	17·2	16·6
Roumania	23·0	21·2	19·4	20·8	21·7	18·7	20·7
Spain	20·2	17·9	16·8	17·3	16·3	16·3	15·9
Sweden	12·1	12·1	11·7	12·5	11·6	11·2	11·2
Switzerland	12·5	12·1	11·6	12·1	12·1	11·4	11.3
Canada	11·2	11·1	10·7	10·1	9·9	9·6	9·4
New Zealand	8·6	8·6	8·6	8·3	8·0	8·0	8·5
South Africa (White)	9·7	9·7	9·7	9·4	9·9	9·3	9·7
U. S. A.	11·8	11·8	11·3	11·1	10·9	10·6	11·0
Japan	21·8	19·3	18·1	19·0	17·7	17·8	18·1
Egypt	25·4	26·2	25·0	26·8	28·8	27·8	26·6

The death rate for the age-period, 15—40 years, was as usual higher among females than among males and the excess is ascribable to the greater risk of death to which women are exposed during child-bearing ages. The subject of maternal mortality has been dealt with in Section III on page 114.

TABLE I (*xviii*).

	Deaths, 15—40 years.		Death rates, 15—40 years.	
	Male.	Female.	Male.	Female.
British India	**588,100**	**648,606**	**10·7**	**12·4**
N.-W. F. P.	5,703	5,534	11	12
Punjab	58,550	56,402	11	13
Delhi	1,854	1,994	10	16
U. P.	103,865	114,853	9	12
B. and O.	102,314	102,937	13	13
Bengal	134,131	152,303	12	14
C. P.	Not available.		Not available.	
Bombay	46,125	52,702	8	12
Madras	91,722	113,997	10	11
Coorg	610	698	13	21
Assam	16,384	20,659	10	13
Burma	25,672	25,116	9	10
Ajmer-Merwara	1,170	1,411	9	13

Death rates for the chief communities are given in Table I (*xix*).

TABLE I (*xix*).

	Hindus.		Muhammedans.		Christians.		Other Classes.	
	Deaths.	Rate. p. m.	Deaths.	Rate. p. m.	Deaths.	Rate. p. m.	Deaths.	Rate. p.m.
British India	**4,742,806**	**28·0**	**1,607,194**	**24·2**	**62,523**	**17·5**	**443,718**	**25·6**
N.-W. F. P.	2,617	15	46,984	21	58	14	6	82
Punjab	272,575	29	362,872	27	10,433	25	3,895	10
Delhi	13,654	33	5,232	25	173	10	..	..
U. P.	1,082,989	26	209,295	29	1,079	5	1,731	15
B. and O.	826,314	27	96,539	23	5,651	17	53,095	26
Bengal	490,383	23	650,705	24	2,603	14	33,196	48
C. P.	449,673	34	21,886	32	..	..	105,576	71
Bombay	470,687	28	73,847	17	4,218	14	5,559	4
Madras	1,018,502	34	74,245	22	32,970	19	1,449	19
Coorg	3,261	22	367	27	..	..	168	47
Assam	87,828	18	54,082	20	1,453	18	12,338	44
Burma	10,700	21	3,475	15	3,865	14	226,507	21
Ajmer-Merwara	13,623	31	2,665	27	20	3	198	9

Table II(i) at page 28 of Section II shows death rates according to disease groups.

Infantile mortality.

8. The year, 1934, was comparatively unhealthy for the infant population in India; and 187 out of every 1,000 born are reported to have died. This compares with a rate of 171 in 1933 and 176, the 5-year mean. The persistent high mortality of infants may be ascribed in part to defective registration not only of births but of infant deaths, through the inclusion of still-births, since a distinction between the two is not always made by the illiterate *Chowkidar* and police *Moharrar*, and partly to the tendency of the more illiterate of the population to underestimate the age of deceased infants. In this respect the remarks of the Director of Public Health, Central Provinces are noteworthy :—

"A study of death registers maintained in urban areas leads one to conclude that more deaths are entered under one year of age than is actually the case. Information given as to the age of children, when reporting their deaths, is usually vague with the result that many deaths over one year of age are returned as under one year. This is clearly shown by the discrepancy usually met with between the vaccination birth registers (which are reliable as the date of death of child is entered against the birth entry) and the general death registers. The former invariably show a much smaller number of deaths in infants under one than recorded in the general death registers."

The provinces chiefly contributing to the increased mortality were the U. P. (+39%), B. & O. (+11%), C. P. (+26%), Burma (+14%) and Ajmer-Merwara (+14%). Minor increases also occurred in Bombay and Madras Presidencies and in Assam. The recorded deaths, 1,734,516, were 9% more than in 1933 and 10% higher than the quinquennial mean of 1,582,282 deaths (176 p. m.).

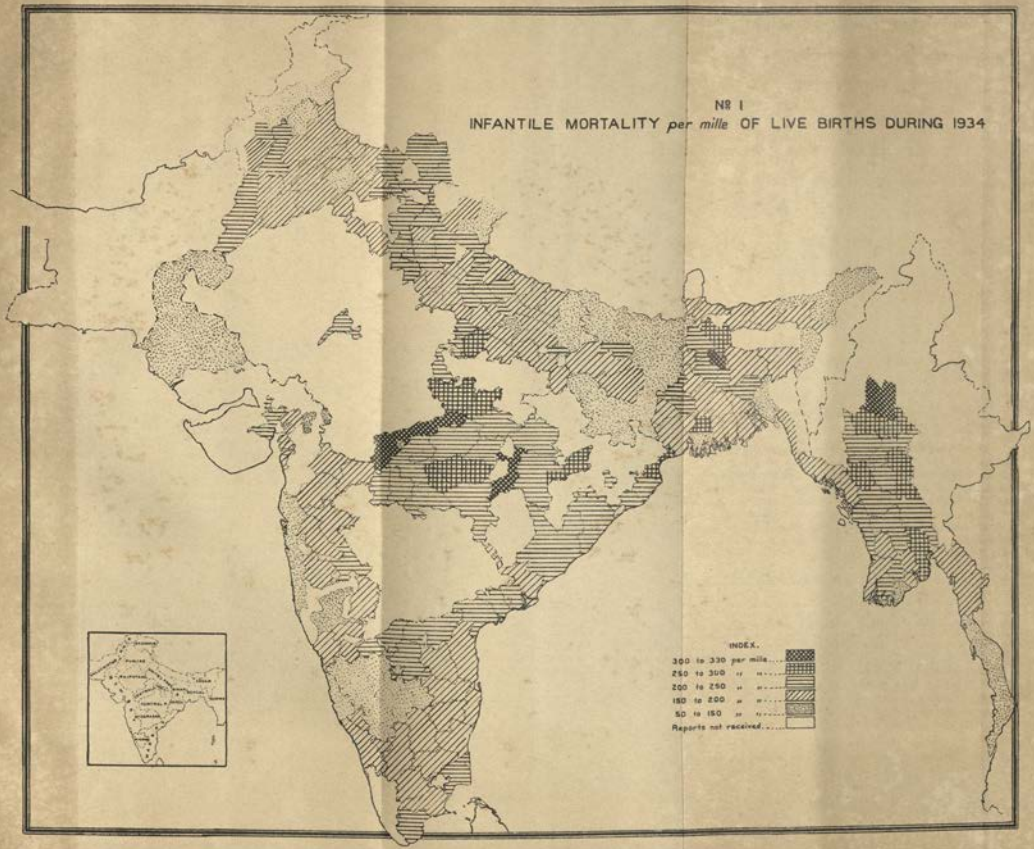

№ I
INFANTILE MORTALITY per mille OF LIVE BIRTHS DURING 1934
INDEX.
300 to 330 per mille
250 to 300 " "
200 to 250 " "
150 to 200 " "
50 to 150 " "
Reports not received

Table I (*xx*) gives details of infantile mortality for British India and for the individual provinces.

TABLE I (*xx*).

	Under one month.		One to six months.		6-12 months.		Total deaths under one year.	Death rate per 1,000 live births.	
	Number.	% of total.	Number.	% of total.	Number.	% of total.		1934.	1933.
British India	**780,918**	**45**	**539,666**	**31**	**413,932**	**24**	**1,734,516**	**187**	**171**
N. W. F. P.	2,977	30	3,282	34	3,506	36	9,765	134	137
Punjab	75,732	43	50,136	29	50,027	28	175,895	187	193
Delhi	1,768	34	1,960	37	1,505	29	5,233	212	226
U. P.	127,310	39	110,813	34	90,310	27	328,433	185	133
B. & O.	92,128	48	61,478	32	36,586	20	190,192	150	135
Bengal	156,981	57	74,901	27	45,312	16	277,194	189	200
C. P.	73,569	42	51,152	29	51,369	29	176,090	253	200
Bombay	50,819	39	46,048	35	33,768	26	130,635	167	161
Madras	159,356	51	77,735	24	78,265	25	315,356	193	185
Coorg	419	54	199	25	162	21	780	189	211
Assam	20,632	51	13,131	33	6,380	16	40,143	165	163
Burma	18,031	22	46,989	58	15,218	20	80,238	219	192
Ajmer-Merwara	1,196	26	1,842	40	1,524	34	4,562	235	207

The foregoing table shows that the wastage of infant life, calculated on live-births, was highest in the Central Provinces, Ajmer-Merwara, Burma and Delhi; in these provinces one child in every 4 or 5 recorded births failed to survive the first year of life. Whilst the percentage of deaths of one week old babies was high in Bengal, Madras, Coorg and Assam, that in Burma was high among infants aged 1—6 months, probably due in part to the local custom of partial feeding at too young an age with rice premasticated by the mother. As in previous years, a steady fall in mortality accompanies the monthly increase in age of infants from 1 to 12 months. These figures suggest that besides defective registration, alluded to previously, skilled maternity or midwifery service is inadequately or poorly provided especially in the rural tracts and that the indigenous *dai*, as it is much cheaper, is still in popular demand; on the other hand, in certain areas, *e.g.*, Hlegu in Burma and Partabgarh in the United Provinces intensive public health measures, as a means of reducing infantile mortality rate has been proved beyond all doubt. The uniformly low death rate among Christians *c.f.* Table I (*xxiv*) lends support to this view as majority of Hindus and Muslims still follow primitive methods.

The poor nutrition of the mother, overcrowding, a high birth rate and high maternal mortality rate, frequent prematurity and the prevalence of respiratory diseases, convulsions, malaria and syphilis, combined with widespread ignorance of infant management, all contribute to the great loss of infant life in India. Birth rate, as also infantile death rate, is high among the poor classes, owing to the inaccessibility to them of efficient medical service. For instance, the aboriginal tribes in the Central Provinces, forming about 9% of the total population, live in unusually unfavourable primitive conditions, mostly in highly malarious forest tracts where there is no medical or public health relief at all.

The infantile mortality rate in British India is compared in Table I (*xxi*) with corresponding rates recorded in other countries. The only countries, having rates at all comparable with those of India, are Roumania, Hungary, Egypt, Portugal, Czechoslovakia and Japan.

TABLE I (*xxi*).

	Quinquennial.		Annual.				
	1921-25.	1926-30.	1930.	1931.	1932.	1933.	1934.
British India	**182**	**178**	**181**	**179**	**169**	**171**	**187**
England and Wales	76	68	60	66	65	64	59
Scotland	92	85	83	82	86	81	78
Belgium	100	95	93	82	87	85	82
Czechoslovakia	155	147	137	134	138	127	126
Denmark	82	82	80	81	72	68	64
France	95	89	78	76	76	75	69
Germany	122	94	85	83	79	76	66
Hungary	187	172	152	162	184	139	150
Italy	126	119	106	113	110	100	99
Netherlands	64	56	51	50	46	44	43
Norway	52	49	46	46	47	..	..
Portugal	146	146	144	146	144	149	..
Roumania	..	192	176	180	185	174	182
Spain	143	124	117	116	111	112	113
Sweden	60	58	55	57	51	50	47
Switzerland	65	54	51	49	51	48	46
Canada	98	93	89	85	73	73	72
New Zealand	43	37	34	32	31	32	32
South Africa (White)	73	67	67	63	69	61	62
U. S. A.	74	68	65	62	59	58	60
Japan	159	137	124	132	118	121	125
Egypt	144	152	151	160	174	162	166

Table I (*xxii*) gives details of infant deaths aged under one week.

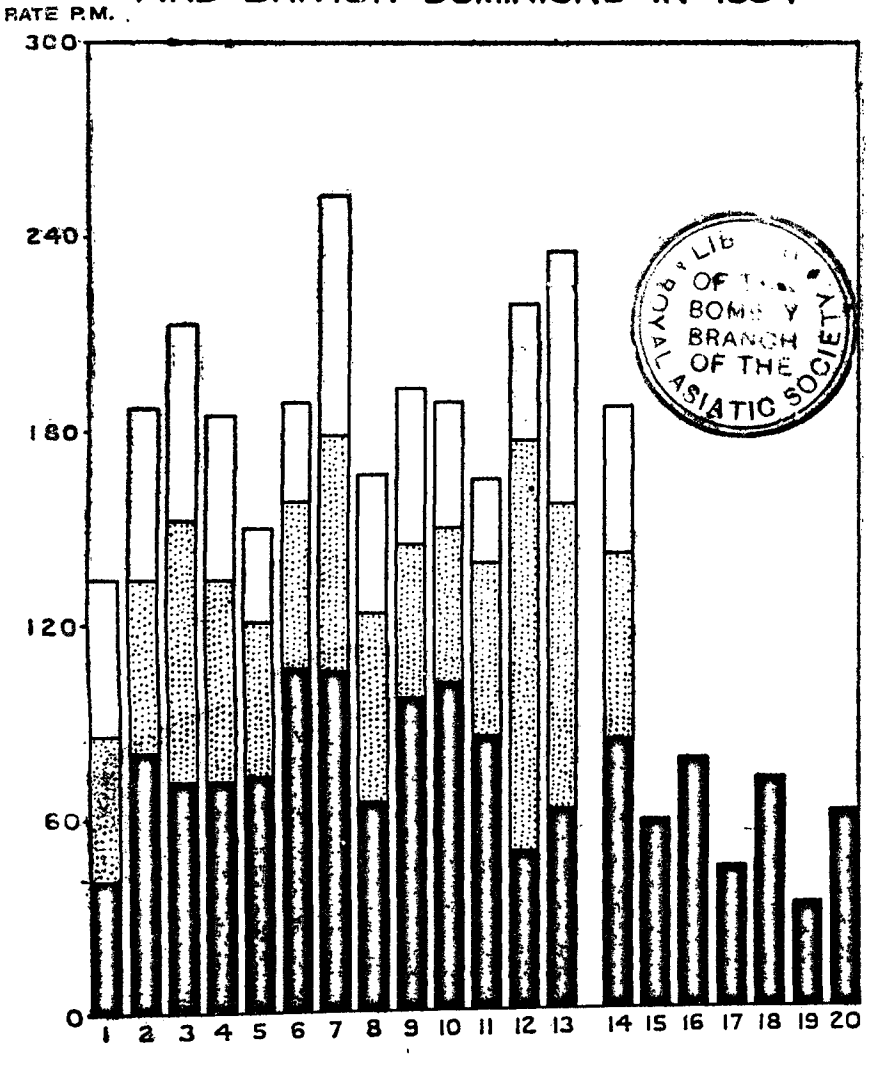
TABLE I (*xxii*).

	Deaths under one week.	Rate p. m. live-births.	Percentage of Deaths under one month.	Percentage of Total infant deaths.
British India*	**429,814**	**50**	**61**	**28**
N.-W. F. P.	1,540	21	52	16
Punjab	41,579	44	55	24
Delhi	1,009	41	57	19
U. P.	78,933	44	62	24
B. & O.	63,326	50	70	33
Bengal	81,333	56	52	22
C. P.		Not available.		
Bombay	28,185	36	55	22
Madras	114,331	70	72	36
Coorg	257	62	61	33
Assam	8,911	37	43	22
Burma	9,729	27	54	12
Ajmer-Merwara	681	35	57	45

*Excluding Central Provinces and Berar.

№ 2

INFANTILE MORTALITY PER MILLE OF BIRTHS IN BRITISH INDIA, ENGLAND AND WALES AND BRITISH DOMINIONS IN 1934



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INDEX.

Under one month....
One to six months...
Six to twelve months.

1 N.W.F.P.
2 Punjab.
3 Delhi.
4 U.P.
5 B.&O.
6 Bengal.
7 C.P.
8 Bombay.
9 Madras.
10 Coorg.
11 Assam.
12 Burma.
13 Ajmer-Merwara.
14 British India.

TOTAL INFANTILE MORTALITY RATES.

15 England & Wales.
16 Scotland.
17 Australia.
18 Canada.
19 New Zealand.
20 Union of S.A.(White)

Table I (*xxiii*) shows the deaths of children and their rates per cent. of total deaths for British India and for the individual provinces. Of the 6,856,244 registered deaths, 42% as against 45% in 1933 occurred among children under 5 years of age and 6% among those aged 5—10 years. In other words 48%, as against 50% in 1933, of the deaths were of children under 10 years of age, a drop of 2% from last year's figure.

TABLE I (*xxiii*).

	Under one year.	% of total deaths.	1—5 years.	% of total deaths.	Total under 5 years.	% of total deaths.	5—10 years.	% of total deaths.	Total 10 years.	% of total deaths.
British India .	**1,734,516**	**25**	**1,186,656**	**17**	**2,921,172**	**42**	**379,531**	**6**	**3,300,703**	**48**
N.-W. F. P. .	9,765	20	8,672	17	18,437	37	3,037	6	21,474	43
Punjab . .	175,895	27	109,159	17	285,054	44	40,561	6	325,615	50
Delhi . .	5,233	28	3,273	17	8,506	45	850	4	9,356	49
U. P. . .	328,433	25	200,868	16	529,301	41	60,699	5	590,000	46
B. and O. . .	190,192	20	218,254	22	408,446	42	61,558	6	470,004	48
Bengal .	277,194	24	171,682	14	448,876	18	86,809	7	535,685	45
C. P. . . .	176,090	30	131,001	23	307,091	53	25,767	4	332,858	57
Bombay . .	130,635	23	110,904	20	241,539	43	26,789	5	268,328	48
Madras . .	315,356	28	176,133	15	491,489	43	51,712	5	543,201	48
Coorg . .	780	21	461	12	1,241	33	198	5	1,439	38
Assam . .	40,143	26	23,251	15	63,394	41	10,445	7	73,839	48
Burma . .	80,238	32	29,148	12	109,386	44	10,488	4	119,874	48
Ajmer-Merwara .	4,562	28	3,850	23	8,412	51	618	4	9,030	55

Infant mortality figures for the different classes of population are again recorded in 7 provinces only and are given in Table I (*xxiv*). A uniform low death rate among Christians continued to be reported in these provinces.

TABLE I (*xxiv*).

	Hindus.		Muhammedans.		Christians.		Other classes.	
	Deaths.	Rate p. m.	Deaths.	Rate p.m.	Deaths.	Rate p. m.	Deaths.	Rate p. m.
N.-W. F. P. .	886	181	8,869	132	10	77	..	..
Punjab. . .	77,679	194	93,943	183	2,837	165	1,436	214
Delhi . .	1,388	237	295	171	10	145	..	..
B. & O. . .	162,709	155	19,352	136	1,008	138	7,123	100
Madras . .	23,607	209	3,627	183	1,151	127	208	188
Coorg . .	692	187	58	218	5	75	25	321
Ajmer-Merwara .	3,638	231	889	258	5	102	30	148

Of the total, 942,190 deaths were of male and 792,326 of female infants. Provincial details are given in Table I (*xxv*). High death rate among female infants in Ajmer-Merwara is a noteworthy feature.

TABLE I (*xxv*).

	Deaths.		Rate per mille.	
	Males.	Females.	Males.	Females.
British India	£42,180	782,816	185	178
N.-W. F. P.	5,621	4,144	137	131
Punjab	95,359	80,556	192	182
Delhi	2,799	2,434	219	205
U. P.	180,777	147,656	192	176
B. and O.	104,083	86,109	159	140
Bengal	148,592	128,602	196	182
C. P.	95,888	80,202	268	236
Bombay	70,727	59,908	175	159
Madras	170,448	144,908	204	182
Coorg	405	375	190	189
Assam	21,893	18,250	174	156
Burma	43,223	37,015	232	207
Ajmer-Merwara	2,375	2,187	225	247

Provincial rural and urban infantile death rates are given in Table I (*xxvi*). Rural death rates were higher than urban in Coorg, Delhi, Assam, Burma and the Punjab. The persistant low urban death rate in Coorg, *viz.*, 36 p. m., is apparently due to the large number of plantation labourers from the adjoining districts of Mysore State and the Madras Presidency who generally leave their families at home. High urban mortality rates particularly in Ajmer-Merwara, where it exceeded the rural rate by 149 p. m. and where it is due presumably to defective registration, in the United Provinces (+96 p. m.) and Bombay Presidency (+63 p. m.) require attention. The urban mortality of infants in the Punjab has declined steadily during the last three years.

TABLE I (*xxvi*).

	Rural.		Urban.	
	Deaths.	Rate p. m. live births.	Deaths.	Rate p. m. live births.
British India	1,532,644	183	201,872	218
N.-W. F. P.	8,379	133	1,386	144
Punjab	155,650	188	20,245	186
Delhi	1,693	234	3,540	204
U. P.	280,722	175	47,711	271
B. & O.	185,092	150	5,100	172
Bengal	262,804	189	14,390	197
C. P.	156,621	253	19,469	259
Bombay	99,125	156	31,510	219
Madras	269,448	192	45,908	198
Coorg	766	206	14	36
Assam	39,362	167	781	125
Burma	70,586	221	9,652	211
Ajmer-Merwara	2,396	185	2,166	334

Causes of Infantile mortality.

9. Table I (*xxvii*) gives the chief causes of infantile mortality in Delhi Province. Febrile and respiratory diseases were again responsible for the largest number of deaths.

TABLE I (*xxvii*).

	1933.	1934.
Smallpox	297	3
Fever	2,799	2,408
Malaria	17	12
Measles	44	2
Diarrhœa	178	178
Respiratory diseases	1,090	1,040
Infantile convulsions	11	10
„ debility	929	756
Ulcer and boils	17	12
Premature birth	42	46
Whooping cough	181	..
Pneumonia	235	301
Typhoid fever	78	55
Injuries	..	8
Sunstroke	..	6
Phthisis	1	1
Dysentery	32	45
C. S. fever	..	2
Other causes	540	348

In the C. P., debilitating influences, dietetic errors and deficiencies, malaria, maternal prenatal weakness and neglect, bad housing, high birth rate, lack of medical aid and ignorance of the bringing up of infants are stated to be the main contributory factors.

Table I (*xxviii*), which gives figures for the chief causes of infantile mortality in Bombay city, is reproduced from the Annual Report of the Health Officer.

TABLE I (*xxviii*).

	1930.	1931.	1932.	1933.	1934.	Mean 1930-34.
All causes	7,506	7,401	6,298	8,320	8,253	7,556
Smallpox	449	2	69	717	33	254
Measles	41	15	16	18	27	23
Malaria	13	5	4	9	9	8
Remittent and undefined fever	203	198	147	167	186	180
Diarrhœa and enteritis	350	366	280	414	455	373
Dysentery	39	34	27	19	40	32
Debility, malformation and premature birth.	2,791	2,987	2,685	3,019	3,384	2,973
Respiratory diseases	2,529	2,646	2,217	2,828	2,983	2,641
Convulsions	626	620	422	594	562	565
Other causes	465	528	431	535	574	507

Table I (*xxix*) gives the causes of infant deaths registered in Rangoon town.

TABLE I (*xxix*).

	Total.		Infant deaths by classes.				
	1933.	1934.	Burmese.	Hindus.	Muhammedans.	Chinese.	Other classes.
Premature birth	462	410	173	139	54	20	24
Malnutrition	207	66	30	27	6	2	1
Convulsions	586	684	357	164	87	43	33
Bronchitis and pneumonia	668	812	266	291	115	79	61
Enteritis	94	66	25	25	11	2	3
Dysentery and diarrhœa	138	146	45	64	16	10	11
Obstruction of bowels	50	101	31	36	20	2	12
Marasmus	84	81	39	28	10	3	1
Whooping cough	3	1	...	...	...	...	1
Fever	40	16	8	5	...	1	2
Diphtheria	...	1	...	1	...	...	...
Influenza	...	2	...	2	...	...	...
Smallpox	2	10	6	3	1	...	...
Other causes	89	255	87	86	53	15	14
Total	2,423	2,651	1,067	871	373	177	163

Still-births.

10. Table I (*xxx*) gives the numbers of recorded still-births in the different provinces but many still-births are not recorded as such and owing to defective registration are included in the infantile mortality returns.

TABLE I (*xxx*).

	Number.	Rate p. m. live-births.
British India	**184,491**	**19·9**
N.-W. F. P.	187	2·6
Punjab	10,190	10·9
Delhi	336	13·6
U. P.	15,809	8·9
B. & O.	42,519	33·5
Bengal	53,580	35·3
C. P.	16,165	23·3
Bombay	12,308	16·0
Madras	20,805	12·7
Coorg	160	39·0
Assam	8,682	35·7
Burma	3,644	10·0
Ajmer-Merwara	106	5·5

In Bombay Presidency the percentage of still to live-births varied from 7 in Bombay city to 10 in Thar and Parkar district. In Burma urban areas recorded 2,720 and rural areas 924 still-births, which correspond to rates of 59·4 and 2·9 p. m.; in Madras Presidency 14,236 and 6,569 or 9·6 and 46·0

per mille of live-births. Table I (*xxxi*) gives the numbers of still-births for the chief communities in some provinces which record them.

TABLE I (*xxxi*).

		Christians.		Hindus.		Muhammedans.		Other class.	
		M.	F.	M.	F.	M.	F.	M.	F.
Bihar & Orissa	R	202	185	20,067	15,040	3,105	2,237	506	434
	U.	3	5	363	247	71	52	2	...
Punjab		188	109	1,954	1,448	3,591	2,718	72	110
U. P.		32		12,541		3,204		32	
N. W. F. P.		...	1	6	6	108	66	...	...
Delhi		4	...	105	76	88	63	...	...

Registration.

11. In estimating the state of public health of any country or community vital statistics have a very definite value and therefore these should be as complete and accurate as possible. The defects in the existing system of registration of births and deaths in India are well known to all public health officers and from time to time improvements have been made here and there with good results, but the attainment of accuracy is a slow process and is largely dependent upon the education of the masses.

In the *N. W. F. P.* the omission of 14,840 births (24%) and 3,550 deaths (7%) was detected on verification. In *Delhi Province* registration has been in force in Delhi city from 1890, in the notified area from 1914, in Delhi Cantonment from 1916 and in New Delhi from 1925. In *Bihar and Orissa* registration is compulsory in all the 58 municipal towns but not in rural areas where, however, voluntary registration is attempted ; the police are the reporting agency in the latter areas and also in most municipalities. As stated in the Report for 1933, the collection, tabulation and verification of vital statistics are now controlled by the public health staff in the bigger municipalities. During the year 1934, the scheme was extended partially to the municipal towns of Ranchi, Puri, Gaya, Chapra and Muzaffarpur where both the municipal health and police staffs reported vital statistics separately. Verification of statistics is carried out in those rural areas where health staffs are employed. In *Bengal* the system of registration, collection and transmission of vital statistics continued to work unsatisfactorily in rural areas, detected omissions to register births and deaths totalling 7,878 and 3,624, respectively, in the Province. In *Madras Presidency* registration was reported to be still defective in most districts due to laxity in the enforcement of the provisions of the Madras Registration of Births and Deaths Act (III of 1899) and this is evident from the fact that during non-epidemic periods the district health staffs detected 22,661 births and 8,148 deaths unregistered in rural areas. In Assam, there was no change in the agencies for the collection of vital statistics ; registration is compulsory in 26 municipal towns but not in rural areas ; in hill districts it is only partially carried out.

Indian States.

12. *General.*—Only a few Indian States submit vital statistics and these have been summarised in Table I (*xxxii*).

TABLE I (*xxxii*).

States.	Population.			Births.			Birth rate p. m.	Total deaths.	Death rate p. m.
	M.	F.	Total.	M.	F.	Total.			
Jind	176,383	148,293	324,676	6,722	6,051	12,773	39	8,035	25
Suket	29,859	28,549	58,408	633	617	1,250	21	1,216	21
Kalsia	33,306	26,542	55,848	1,097	1,009	2,106	37	1,458	24
Maler Kotla	45,883	37,189	83,072	1,071	836	1,907	23	1,435	17
Baghat	5,744	3,981	9,725	48	64	112	12	106	11
Jawhar	29,502	27,759	57,261	1,055	1,050	2,105	37	1,403	25
Dhrol	13,614	14,039	27,653	632	535	1,167	42	563	20
Kolhapur	476,105	453,153	929,258	17,424	16,961	34,385	37	23,712	26
Mysore	3,385,049	3,227,438	6,612,486	60,484	56,818	117,302	18	113,591	17

Mysore State.—The highest birth rate, 21·3 p. m., was reported in Bangalore district and the lowest 13·3 p. m. in Chitaldrug district. The urban birth rate of 27·4 p. m. exceeded the rural by 11·3 p. m. The ratio of male to female births was 106 to 100. The death rate varied between 22 p. m. in Chitaldrug and 14 p. m. in Kolar district. The rural death rate was 17 p. m. and the urban rate 20 p. m. Infant deaths numbered 14,226, with a rate of 121 p. m. of live-births, the highest number being recorded in December and the lowest in May.

SECTION II.

HISTORY OF CHIEF DISEASES.

Chief causes of mortality.

13. Judging by the recorded statistics, imperfect though these are, the year 1934, was a moderately healthy one, the death rate, though in excess of that for 1933, was the second lowest during the past decade. As before, the "fevers" group contributed the largest number of deaths, *i.e.*, 58% of the total, "other causes" following with 26%. The percentage mortality under other disease headings was low, 16% of the total deaths being attributed to these. The major epidemic diseases of cholera, plague and smallpox together accounted for 4% and a combined death rate of 1·3 p. m. Compared with 1933, deaths from cholera increased by over 192%, those from plague by 90%; fevers by 12%; dysentery and diarrhœa combined by 16%, respiratory diseases by 9% while those from smallpox decreased by 19%. Table II(*i*) and diagram No. 3 facing page 28 give total deaths and rates *per mille* for the chief groups of diseases under which deaths are registered in British India. These figures cannot be regarded as giving an accurate picture of mortality conditions since nowhere in India is complete registration of deaths by causes carried out and medical certification is almost entirely absent in rural areas and very imperfect in most urban areas.

Table II (*ii*) gives the male and female deaths and rates *per mille* of the more important registered groups of diseases for British India and for various provinces. The incidence of these diseases is more fully discussed in later paragraphs.

As conditions exist, the present classification is the only practicable one for general adoption in India. During the last 10 or 15 years an effort has been made in a few provinces to analyse the mortality recorded under fevers, respiratory diseases and dysentery and diarrhœa, *cf.* Table II (*xxii*), but the value of such a sub-classification is doubtful so long as the present system of registration remains. Since the introduction of registration, responsibility for recording vital statistics has lain with the *Chowkidar* or the *thana Moharrar* or village headman in rural areas and with the municipal clerk or the attendant at the cremation or burial grounds in urban areas. Medical verification of causes of death is for the most part impracticable and wherever attempts at this have been made gross errors or omissions have been detected. The only reliable records are those maintained in such large municipalities as employ qualified M. O. Hs. with reasonably literate subordinate staffs. Recent verification work in the Hlegu Health Unit in Burma which is mainly a rural area shows an error of 76·2% in the death rate during the quinquennium preceding the inception of the Unit. Evidence is abundant to show that throughout the country especially among the lower and middle classes there is always the tendency to conceal cases of cholera, smallpox, plague, enteric fever, leprosy, cerebro-spinal fever and lung tuberculosis for fear of quarantine or segregation in infectious diseases hospitals. Table II (*iii*) which has been prepared by the D. P. H. of the U. P. shows possible variations in the recorded and verified figures in that province during 1934.

Abbreviations :—

P. M.—*Per mille*.
C. P.—Central Provinces and Berar.
B. & O.—Bihar and Orissa.
U. P.—United Provinces of Agra and Oudh.
M. O. H.—Medical Officer of Health.
D. P. H.—Director of Public Health.
B. E. L. R. A.—British Empire Leprosy Relief Association.
C. S. M.—Cerebro-spinal meningitis.
P. H. Deptt.—Public Health Department.

TABLE II (*i*).

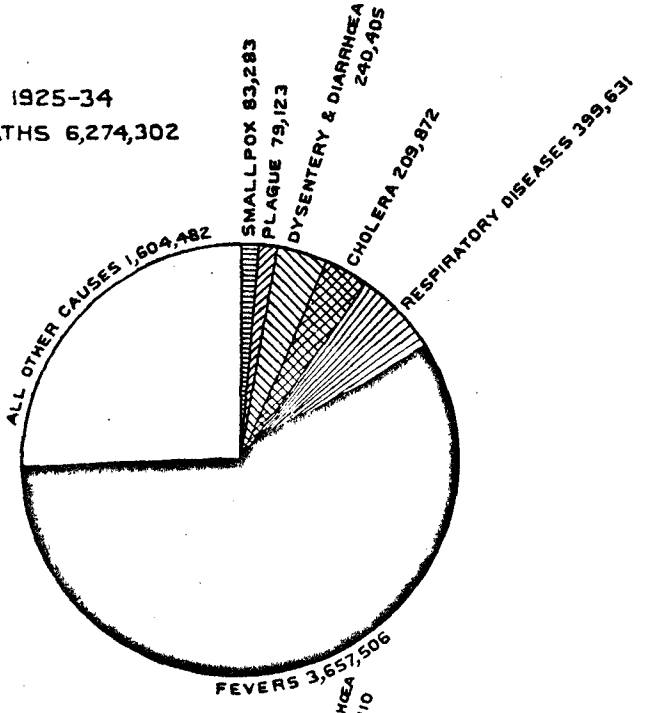
		Cholera.		Smallpox.		Plague.		Fevers.		Dysentery and Diarrhœa.		Respiratory Diseases.		Other causes.		Total.	
		Deaths.	Rate p.m.	Deaths.	Rate p.m.	Deaths.	Rate p.m.	Deaths.	Rate p.m.	Deaths.	Rate p.m.	Deaths.	Rate p.m.	Deaths.	Rate p.m.	Deaths.	Rate p.m.
British India	**1934**	**199,708**	**0·7**	**83,928**	**0·3**	**80,131**	**0·3**	**3,957,077**	**14·4**	**285,110**	**1·0**	**483,018**	**1·8**	**1,767,272**	**6·4**	**6,856,244**	**24·9**
	1933	68,318	0·3	103,641	0·4	42,631	0·2	3,530,299	12·9	246,164	0·9	443,305	1·6	1,662,429	6·1	6,096,787	22·4
N.-W. F. P.		..	..	615	0·3	..	..	40,873	16·8	285	0·1	3,151	1·3	4,741	1·9	49,665	20·4
Punjab		178	..	1,692	0·1	8,069	0·3	461,317	18·7	12,411	0·5	55,570	2·3	110,538	4·4	649,775	26·3
Delhi		19	..	22	..	2	..	10,457	5·7	800	1·2	4,489	6·7	3,279	4·9	19,059	28·5
U. P.		31,903	0·6	14,817	0·3	47,688	0·9	970,289	19·2	18,140	0·4	46,567	0·9	165,690	3·3	1,295,094	25·6
B. & O.		57,289	1·5	30,310	0·8	5,411	0·1	670,389	17·1	23,481	0·6	7,348	0·2	187,371	4·8	981,599	25·1
Bengal.		50,742	1·0	8,296	0·2	1	..	764,492	15·0	53,947	1·1	85,113	1·7	214,296	4·2	1,176,887	23·2
C. P.		27,329	1·7	2,282	0·1	967	0·1	302,119	18·6	38,075	2·3	45,181	2·8	161,182	9·9	577,135	35·5
Bombay		11,362	0·5	5,516	0·2	13,307	0·6	201,405	8·9	26,301	1·2	106,568	4·7	189,852	8·4	554,311	24·5
Madras		18,158	0·4	18,088	0·4	2,353	..	325,050	6·9	97,844	2·1	107,742	2·3	557,929	11·8	1,127,169	23·9
Coorg		1	..	45	0·3	10	0·1	2,801	17·0	177	1·1	152	0·9	610	3·7	3,796	23·1
Assam		1,904	0·2	206	..	..	..	101,779	12·4	8,195	1·0	6,440	0·9	37,177	4·5	155,701	19·0
Burma.		822	0·1	1,601	0·1	2,318	0·2	94,167	7·5	5,031	0·4	12,991	1·0	132,617	10·6	249,547	19·9
Ajmer-Merwara		1	..	438	0·8	..	..	11,939	20·8	423	0·7	1,715	3·0	1,990	3·5	16,506	28·8

№ 3

BRITISH INDIA

COMPARATIVE DIAGRAMS OF DEATHS BY CAUSES

MEAN 1925-34
TOTAL DEATHS 6,274,302



YEAR 1934-
TOTAL DEATHS 6,856,244

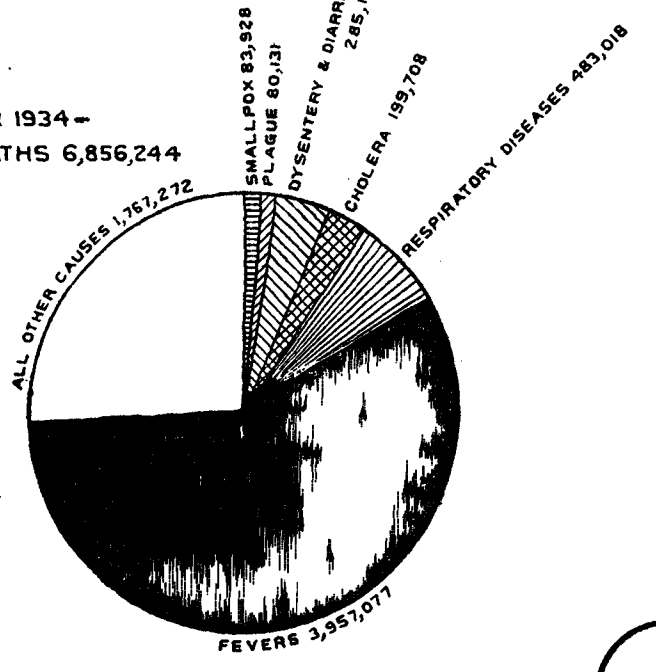


TABLE II (ii).

	Cholera.				Smallpox				Plague.			
	Deaths.		Rate p.m.		Deaths.		Rate p.m.		Deaths.		Rate p.m.	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
British India	102,563	97,145	0·7	0·7	42,723	41,205	0·3	0·3	34,923	45,208	0·2	0·3
N.-W. F. P.	...	...	...	...	323	292	0·2	0·3	...	...	...	...
Punjab	113	65	...	...	897	795	0·1	0·1	3,512	4,557	0·3	0·4
Delhi	11	8	...	...	12	10	...	...	2	...	...	...
U. P.	16,353	15,550	0·6	0·6	7,582	7,235	0·3	0·3	20,696	26,992	0·8	1·1
B. & O.	29,386	27,903	1·5	1·4	15,575	14,735	0·8	0·8	2,066	3,345	0·1	0·2
Bengal	26,617	24,125	1·0	0·9	4,229	4,067	0·2	0·2	1	...	...	...
C. P.	13,712	13,617	1·7	1·7	1,142	1,140	0·1	0·1	437	530	0·1	0·1
Bombay	5,595	5,767	0·5	0·5	2,676	2,840	0·2	0·3	5,921	7,386	0·5	0·7
Madras	9,286	8,872	0·4	0·4	9,023	9,065	0·4	0·4	1,042	1,316	...	...
Coorg	1	...	...	...	18	27	0·2	0·4	6	4	0·1	...
Assam	988	916	0·2	0·2	108	98	...	...	...	...	...	...
Burma	500	322	0·1	...	909	692	0·1	0·1	1,240	1,078	0·2	0·2
Ajmer-Merwara	1	...	...	...	229	209	0·8	0·7	...	...	...	...

	Fevers.				Dysentery and Diarrhœa.				Respiratory Diseases.			
	Deaths.		Rate p.m.		Deaths.		Rate p.m.		Deaths.		Rate p.m.	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
British India	2,062,076	1,895,001	14·5	14·2	148,316	136,794	1·0	1·0	272,411	210,607	1·9	1·6
N.-W. F. P.	22,282	18,591	16·9	16·6	172	113	0·1	0·1	1,842	1,309	1·4	1·1
Punjab	244,019	217,298	18·1	19·3	6,627	5,784	0·5	0·5	31,362	24,208	2·3	2·2
Delhi	5,354	5,103	13·9	18·1	435	365	1·1	1·3	2,459	2,021	6·4	7·2
U. P.	516,826	453,463	19 5	18·9	9,294	8,846	0 4	0·4	24,546	22,021	0·9	0·9
B. & O.	347,594	322,795	17·8	13·5	12,463	11,018	0·6	0·6	4,365	2,983	0·2	0·2
Bengal	390,700	373,792	14·8	15·3	28,408	25,539	1·1	1·0	53,272	31,841	2·1	1·3
C. P.	157,005	145,114	19·3	17·9	19,532	18,543	2·4	2·3	26,579	18,602	3·3	2·3
Bombay	102,507	98,898	8·6	9·2	13,686	12,615	1·2	1·2	58,272	48,296	4·9	4·5
Madras	164,177	160,873	7·0	6·8	50,155	47,689	2·1	2·0	57,440	50,302	2·5	2·1
Coorg	1,382	1,419	15·2	19·4	101	76	1·1	1·0	105	47	1·2	0·6
Assam	54,189	47,590	12·5	12·3	4,395	3,800	1·0	1·0	3,822	2,618	0·9	0·7
Burma	49,713	44,454	7·8	7·2	2,849	2,182	0·4	0·3	7,466	5,525	1·2	0·9
Ajmer-Merwara	6,328	5,611	20·8	20·7	199	224	0·7	0·8	881	834	2·3	3·7

TABLE II (*iii*).

	Percentage of total deaths reported by		Calculated number of deaths on the data supplied by professional agency.	Actual No. of deaths reported by ordinary agency.
	Verified agency.	Unverified agency.		
Cholera	2·57	2·46	32,205	31,903
Smallpox	0·18	1·14	2,285	14,817
Plague	0·11	3·68	1,428	47,688
Dysentery	4·72	0·60	61,113	7,739
Enteric fever . . .	1·78	0·63	19,134	8,143
Relapsing fever . . .	..	0·05	..	613
Malaria	1·12	67·42	14,564	873,056
Kala-azar	0·24	0·03	3,151	423
Pneumonia	10·08	1·16	131,080	15,039

It is to be hoped that this Table is not representative of the country as a whole.

Far too many deaths continue to be included under the heading "all other causes". Of a total of 1,767,173 deaths included in this group, details of causes are available in the records of the various provinces for 102,820. Thus still there remain 1,664,353 deaths, the causes of which remain almost unknown. Table II (*iv*) gives details.

TABLE II (*iv*).

	Injury.							
	Suicide.		Wounds or accidents.	Snake bite or killed by wild beasts.	Rabies.	Total.	Other causes.	Total other causes.
	M.	F.						
British India	**6,368**	**7,407**	**62,816**	**23,100**	**3,129**	**102,820**	**1,664,353**	**1,767,173**
N. W. F. P.	13	9	787	23	2	834	3,907	4,741
Punjab	187	198	5,333	707	160	6,585	103,953	110,538
Delhi	13	12	253	17	2	297	2,982	3,279
U. P.	624	1,207	13,941	4,436	660	20,868	144,822	165,690
B. & O.	876	1,309	8,935	5,580	176	16,876	170,356	187,232
Bengal	1,540	1,740	13,138	4,796	830	22,044	192,292	214,336
C. P.	827	735	3,974	1,314	134	6,984	154,198	161,182
Bombay	381	250	5,631	1,591	206	8,059	181,793	189,852
Madras	1,558	1,696	6,369	2,672	412	12,707	545,222	557,929
Coorg	7	2	37	4	..	50	560	610
Assam	212	160	1,578	77	290	2,317	34,860	37,177
Burma	128	79	2,666	1,824	257	4,954	127,663	132,617
Ajmer-Merwara	2	10	174	59	..	245	1,745	1,990

Some provinces are trying to analyse the mortality recorded under this *omnibus* heading in selected areas. For example, for Delhi Province, the ascertained causes of 2,982 deaths due to "other causes" have been given in Table II (*v*).

TABLE II (*v*).

	No. of deaths.
Osteomalacia	3
Post-partum haemorrhage	3
Heat-stroke	4
Diphtheria	5
Eclampsia	7
Infantile convulsions	10
Sunstroke	11
Puerperal septicaemia	18
Heart failure	24
Premature birth	46
Other deaths from child-birth	110
Infantile debility	756
Other causes	1,985

In 15 municipal towns, employing M. O. Hs., in Madras Presidency a similar analysis has been attempted for some years now, and this year in these towns the death rate under "other causes," was after verification reduced from 32 p.m. to 2 p.m.

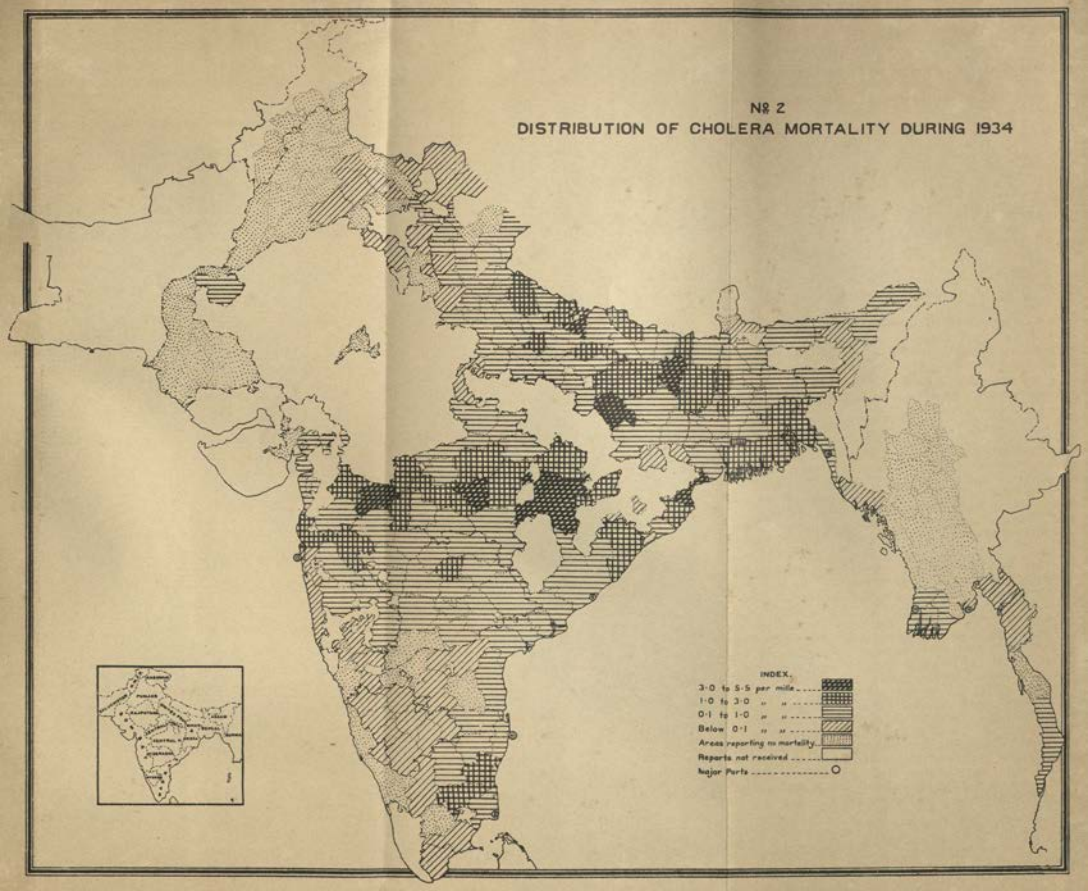
No addition was made to the lists of notifiable diseases, except in the Bombay Presidency and U. P. where cerebro-spinal fever was added.

Cholera.

(*a*) *General.*

14. The forecast was made in the Annual Report for 1933 that "during the next two to three years, there is every hope that the cholera mortality figures will not reach undue dimensions". Whilst the number of recorded deaths rose from 68,318 in 1933 to 199,708 and the rate *per mille* from 0·3 to 0·7, these figures are below the decennial averages of 219,272 and 0·9 p.m. respectively, though they exceed the five-year means. The provisional data for the first nine months of 1935 show that this upward trend has been maintained.

A table published at page 33 of last year's report showed the recorded cholera deaths by quinquennial periods from 1877 onwards. As it tended to show that the violent outbreaks of the past are becoming less frequent, a feature which seemed probable in view of the development of the public health services, and the powerful prophylactic now available in cholera vaccine, the occasion has been taken to examine whether there has yet been an appreciable decline in cholera mortality and to examine the part played by festivals in cholera incidence over the period, 1877 to 1933. A statistical analysis has been made by Dr. Raja of the All-India Institute of Hygiene and Public Health based on data taken from the Public Health Commissioner's Annual Reports. The investigation indicates that within the period examined, there is no clear evidence of a significant fall in cholera mortality in British India. A possible explanation for this result is that, with the development of Provincial Public Health Departments, the beneficial effects of preventive work may have been neutralised by improvement in the registration of vital statistics. If this be so, a longer range of data made available after the lapse of some years, should show a decline. In any case, the significance of the record low figures of 1932-34 remains to be seen.


№ 2
DISTRIBUTION OF CHOLERA MORTALITY DURING 1934
INDEX.
3·0 to 5·5 per mille
1·0 to 3·0 " "
0·1 to 1·0 " "
Below 0·1 " "
Areas reporting no mortality
Reports not received
Major Ports

With regard to the part played by great festivals, a comparison between festival and non-festival years in the U. P. and Punjab shows that the mean cholera incidence is higher in festival years than in non-festival years, and also that in the former the curve of seasonal incidence rises more sharply than in the latter years.

A marked increase of cholera occurred in its endemic home in Northern India, *i.e.*, in the provinces of U. P., B. & O. and Bengal, which together reported 139,934 deaths or 70%of the total as against 48,671 or 71%in 1933, yielding rates of 1·0 p. m. and 0·4 p. m., respectively. The mortality curve reached a high level in the C. P. and Berar where the death rate was 17 times higher than the mean. In the C. P. and Berar infection was imported from Puri, a festival centre in Orissa, and spread rapidly. Madras Presidency in the extreme south and Bombay Presidency also experienced severe epidemics, though the death rate did not exceed the mean. The Punjab, Delhi, Assam and Burma were lightly or sporadically infected. The decrease in Assam was notable, the death rate being less than one third of that for 1933 and one fourth of the quinquennial mean. The N. W. F. P., Ajmer-Merwara and Coorg remained free, except for one death each in the latter two provinces.

The quinquennial averages for the period, 1877-1931, and the triennial averages for the years, 1932 and 1933, are given below :—

Periods.	Total deaths.	Annual average.
1877—81	1,468,487	293,697
1882—86	1,457,114	291,423
1887—91	2,030,020	406,004
1892—96	2,243,590	448,718
1897—01	1,942,016	388,403
1902—06	1,862,132	372,426
1907—11	2,023,514	404,703
1912—16	1,675,833	335,167
1917—21	1,986,978	397,296
1922—26	724,184	148,437
1927—31	1,509,680	301,936
1932	67,219	
1933	68,318	111,748
1934	199,708	

Table II (*vi*) gives the recorded deaths for British India and the various provinces.

TABLE II (*vi*).

	1932.	1933.	1934.	Quinquennial mean (1929-33).
Total	**67,219**	**68,318**	**199,708**	**197,841**
N. W. F. P.	70	..	..	131
Punjab	614	160	178	931
Delhi	4	..	19	53
U. P.	9,734	1,915	31,903	31,005
B. & O.	9,348	17,514	57,289	65,411
Bengal	33,910	29,242	50,742	55,656
C. P.	854	2,152	27,329	9,312
Bombay	1,353	7,797	11,362	10,404
Madras	5,278	3,851	18,158	16,791
Coorg	..	..	1	28
Assam	4,971	5,508	1,904	6,020
Burma	1,082	179	822	2,085
Ajmer-Merwara	1	..	1	19

Table II (*vii*) gives the numbers of registered cases during each quarter in 1933 and 1934.

TABLE II (*vii*).

	1st		2nd		3rd		4th	
	1933.	1934.	1933.	1934.	1933.	1934.	1933.	1934.
Total . .	51,582	19,650	24,220	47,933	30,068	152,002	27,209	62,201
N.-W. F. P. .	..	..	..	..	..	..	..	1
Kashmir .	..	..	..	..	..	..	..	..
Punjab . .	3	..	42	71	139	165	107	..
Punjab States .	..	..	8	..	..	206	..	57
Delhi . .	..	..	1	3	1	18	..	..
U. P. . .	244	53	1,291	4,602	194	17,800	31	4,750
B. & O. . .	1,411	2,855	1,353	12,039	5,786	38,980	5,022	7,666
Bengal . .	12,287	12,131	12,975	18,362	1,351	7,405	2,930	21,276
Bengal States .	2	..	69	15	..	3	1	191
C. P. . .	85	51	614	4,894	3,647	38,442	1,700	7,262
C. I. Agency .	22	3	40	941	1,487	6,944	327	917
Bombay . .	1,061	743	3,186	2,477	8,820	20,387	3,714	3,144
Bombay States	8	98	198	9	1,316	223	473	293
Hyderabad State . .	164	311	3,408	1,466	4,721	5,700	1,144	2,995
Mysore State .	..	6	4	5	5	14	7	62
Madras . .	141	3,059	65	2,552	2,230	13,137	5,699	10,679
Assam . .	138	300	720	180	225	166	6,023	1,607
Burma . .	14	5	179	243	143	68	8	476
Ajmer-Merwara	2	..	..	1	..	..	..	2
Other Indian States . .	..	35	67	73	3	2,344	23	823

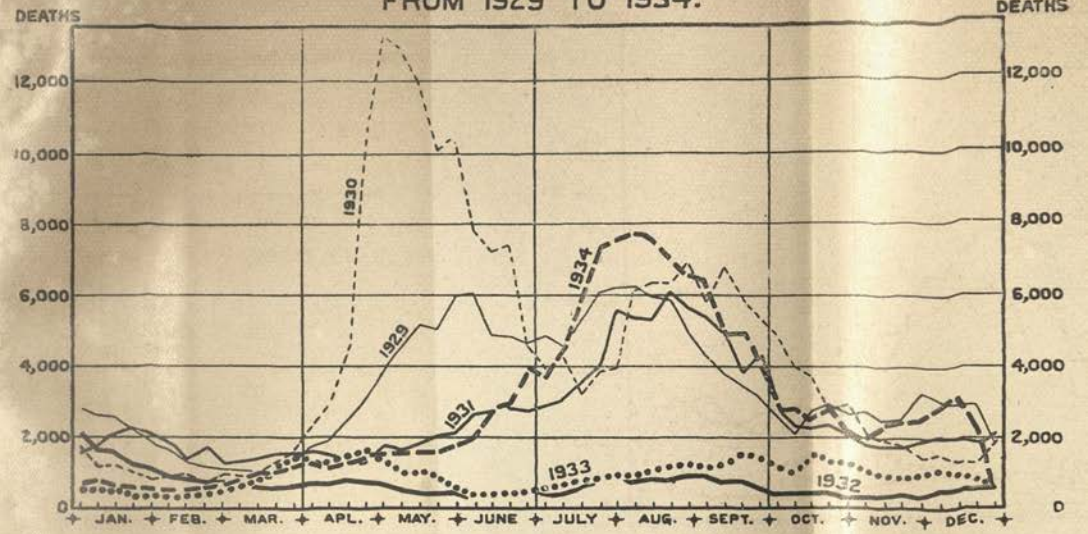
Early in 1934 the mortality curve, as judged from the weekly recorded figures, was identical with that in 1933, and of the 13,172 cases recorded up to the 22nd April, 59 % were in Bengal and 15 % in B. & O. In the former province the seasonal maximum was reached in May and the downward tendency was slower than in previous years. Towards the end of May, cholera invaded the districts of Bihar on the right bank of the Ganges, *viz.*, Shahabad, Santal Parganas and Palamau, by the middle of June it spread upstream to the districts of Azamgarh, Ghazipur and Ballia in the U. P. as well as towards the south-west infecting the districts of Raipur, Bilaspur and Drug in the C. P. Up to this time Madras Presidency had suffered only slightly but the districts of Ganjam (bordering on Orissa) and Chingleput were infected in June and during July and August, the disease spread to Vizagapatam in the north and Chittoor and Arcot in the South. During the first six months of the year, the incidence was higher than in 1933 and particularly high in Bengal, B. & O and U. P. in May and June, these provinces reporting 35,003 cases or 73 % during the 2nd quarter of the year.

During the 3rd quarter the incidence curve maintained an upward trend, 42 % more cases than in the corresponding period of 1931. The areas most affected were those of the Ganges Valley, the C. P. and C. I. Agency.

During the last three months of the year a high increase occurred in Bengal, and incidence was also high in the U. P. and Madras Presidency.

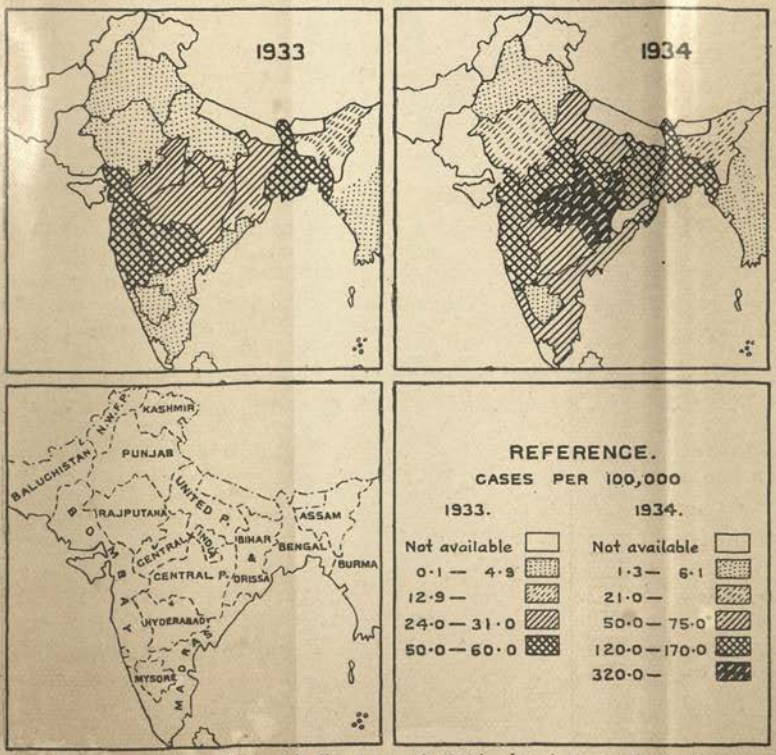
№ 4

WEEKLY NUMBER OF DEATHS FROM CHOLERA IN INDIA FROM 1929 TO 1934.



CHANGES IN THE GEOGRAPHICAL DISTRIBUTION OF CHOLERA IN INDIA DURING 1933 & 1934

(CASES REPORTED PER 100,000 INHABITANTS IN EACH PROVINCE.)



NOTE:- Based on data published in the League's Epidemiological reports for the year 1936.

The seasonal maximum for India as a whole occurred at the beginning of August which was the period of high prevalence in most infected provinces. Table II (*vii*) and graph No. (4) should be studied for further details.

Table II (*viii*) gives details for rural and urban rates for each province. The former were again the higher. In India, the spread of cholera is closely associated with pilgrimages such as occur at Hardwar, Allahabad, Nasik, Ganga Sagar, etc., which draw large numbers from the rural areas.

TABLE II (*viii*).

	Rural.		Urban.	
	Deaths.	Rate p. m.	Deaths.	Rate p. m.
Total	**187,502**	**0·8**	**12,206**	**0·4**
N.-W. F. P.	..	..	..	..
Punjab	140	..	38	..
Delhi	..	..	19	..
U. P.	30,251	0·6	1,652	0·4
B. & O.	55,883	1·5	1,406	1·0
Bengal	47,546	1·0	3,196	0·9
C. P.	24,559	1·7	2,770	1·6
Bombay	10,399	0·6	963	0·2
Madras	16,133	0·4	2,025	0·3
Coorg	1	..	..	..
Assam	1,884	0·2	20	0·1
Burma	706	0·1	116	0·1
Ajmer-Merwara	..	..	1	..

The Director, Eastern Bureau of the League of Nations, Singapore, reported that during 1934 eight ships were infected with cholera. Although the source of infection was uncertain in most cases, it was believed to be from ports in British India.

Details of cholera research will be found in Section VIII on page 209.

(*b*) *Provincial.*

N. W. F. P.—The disease was again absent.

Punjab.—Cholera incidence was again one of the lowest recorded, attacks numbering 279 and deaths 178. Of the 29 districts, 11 remained free. The largest number of deaths reported in any one district was 38 in Ambala where infection was imported from the neighbouring state of Kalsia. In Karnal district also infection was imported from Hardwar.

Delhi.—Seizures and deaths numbered 21 and 19, respectively, from April to September. Of these 18 cases with 15 deaths were recorded in Delhi city; 3 deaths were reported in the Notified Area and one in New Delhi.

U. P.—This province experienced a severe epidemic and 3 out of every 100 deaths registered were ascribed to this cause. Basti and Azamgarh districts in the Gorakhpur division recorded over 30 % of the total provincial mortality; after which Ballia and Ghazipur in the Benares Division, Rae Bareli, Sitapur and Kheri in the Lucknow division and Gonda in the Fyzabad division were the chief sufferers (*cf.* map facing page 32). In order to prevent further importation of infection and to intercept cases from Nepal

a scheme, called the " barrier scheme ", was instituted at Basti and Gorakhpur on the Nepal border. More deaths occurred in rural than in urban areas. The larger towns with a population of 30,000 or over however did not enjoy that comparative immunity which was noticeable in previous years. The infection in almost every city was reported to be brought by pilgrims returning from fairs. The highest mortality occurred in August and the lowest in January. Nearly 90 % of the total deaths were recorded between June and October.

B. & O.—It was a bad cholera year for South Bihar, Orissa and Chota Nagpur. Rural areas were badly affected, the low urban rate being ascribed to better standards of sanitation.

Cholera started in epidemic form in the districts of Balasore, Cuttack and Puri in the beginning of the year and remained prevalent throughout the year in these districts. From the beginning of May, 1934, the disease assumed a definitely epidemic character in most of the districts of South Bihar and Chota Nagpur. The districts of North Bihar, although they were the worst affected by the earthquake, remained comparatively free from cholera.

Bengal.—Eleven districts reported death rates in excess of the provincial average. The highest mortality was recorded in Faridpur (2·3 p. m.), Bakarganj, (2·2 p. m.) and Murshidabad (2·1 p.m.) ; in the remaining 8 districts the rates varied between 1·1 p. m. and 1·7 p. m.

In January, 1,912 deaths were registered ; in April the number rose to 6,473 ; fell down to 919 in September but flared up again to attain its maximum (11,702 deaths) in December.

C. P.—The D. P. H. reports :—

" The disease first appeared during February in Raipur district, the source of infection being Jagan Nath, Puri.

" During March, it started in Bilaspur from the same source. From there it spread to Bhandara, Drug and Nagpur districts. During July Saugor was infected from Allahabad and the disease spread to the neighbouring districts of Jubbulpore and Mandla. During August, Berar districts were infected from Nasik and Khandesh. By August the disease was well established in every district in the province and remained in an intense form during September and October. It began to subside during November and had gradually disappeared by the end of December. The chief sources of dissemination were fairs, wandering tribes, marriage parties and the extensive road motor traffic . Bad water supplies, inefficient and defective conservancy and drainage assisted in the quick spread of infection."

Bombay.—Severe epidemic conditions prevailed throughout the year, and recorded mortality increased by 46% and 9% compared with 1933 and the quinquennial mean. The Northern Registration District was worst affected, incidence being very high as compared with 1933, particularly in East Khandesh district which returned 18,057 attacks and 4,171 deaths or 73% of the total mortality in this Registration District and 37 % of the provincial total. Meteorological conditions being favourable, the intensity of infection was greatest from July to September. The districts of West Khandesh, Surat and Panch Mahals were less severely infected. In East Khandesh district which was first infected the source of infection was uncertain ; West Khandesh with 2,777 attacks and 854 deaths was infected later and here the infection was imported from Baroda territory. In the Central Registration District with 3,972 deaths, infection was carried over from the previous year and was severe in the districts of Ahmednagar (2,338 attacks and 1,158 deaths) ; Poona (2,193 and 1,126) ; Thana (1,315 and 917) and Nasik (1,587 and 725). The period of greatest prevalence in the Central Registration District was April

to September. The epidemic of 1933 carried over in the Southern Registration District in a mild form, the bulk of the cases occurring in the districts of Satara (1,045 deaths) and Sholapur (458 deaths). Sind Registration District was practically free, only 2 cases with one death being recorded. Bombay city recorded 13 deaths.

Madras.—Mortality showed a phenomenal rise during the year, the deaths increasing by 14,307. During the first half of the year, prevalence was slight but in the latter half infection became widespread, and over 80% of the total deaths were reported during this period. In the northern group of districts Ganjam was severely infected almost throughout the year; in other districts the epidemic was mild. Among the central group, the ceded districts were practically free; Chittoor was mildly infected; Nellore, Chingleput and North Arcot suffered rather heavily while the endemic deltaic districts of Trichinopoly, South Arcot and Tanjore bore the brunt of the infection during the year, about 50% of the total deaths occurring in these three districts. Whilst in South Arcot the epidemic prevailed in a severe form throughout the year, in Trichinopoly and Tanjore a winter epidemic was experienced. The southern group of districts and the west coast districts were practically free, except Salem, which suffered from a mild outbreak in December.

Assam.—Epidemic cholera in a serious form was absent, although the usual bi-annual visitation occurred in the form of small local outbreaks scattered over wide areas, which however in no case assumed epidemic proportions.

Burma.—This province recorded a low incidence. Unlike previous epidemics which occurred in spring this year, the disease appeared in a mild epidemic form in autumn and continued with increasing severity up to the end of the year. Starting in Myaungmya district in October, it spread to the adjacent districts of Maubin and Pyapon and reached Bassein in November. These four districts, situated in the delta of the Irrawaddy river, are characterised by a net-work of water-ways with a large proportion of the population living and moving about in boats. The fact that this river in many cases fulfils the threefold function of a watersupply, a washing place and a latrine is an important feature of the epidemiology of cholera in these areas.

(c) *Anti-cholera measures.*

Routine sanitary measures, such as, improvement and disinfection of water supplies in villages and at *melas*, etc., improvement of conservancy, medical inspection at railway stations of pilgrims, the enforcement of temporary regulations under the Epidemic Diseases Act, the employment of epidemic staffs, and propaganda were adopted in various centres as and when necessary.

Inoculation with cholera vaccine remains the most effective method of personal prophylaxis. By its use alone it is possible to prevent or suppress an outbreak and those, who have most experience of its employment value it most highly. Unfortunately many still prefer to run the risk of infection otherwise our figures for cholera deaths would be far lower than they are.

The great gift of anti-cholera inoculation must not however be allowed to impede the execution of measures for the removal of those conditions of gross insanitation in which alone cholera can flourish.

Table II (*ix*) gives the numbers of anti-cholera inoculations performed during 1933-34.

TABLE II (*ix*).

	1933.	1934.
British India	1,949,244	5,335,787
N.-W. F. P.	..	464
Punjab	30,077	22,091
Delhi	22	406
U. P.	26,629	355,621
B. & O.	20,000	1,022,353
Bengal.	1,036,643	2,106,269
C. P.	103,118	619,978
Bombay	110,639	248 289
Madras	174,786	770,089
Coorg	..	..
Assam	413,282	93,998
Burma	34,029	96,224
Ajmer-Merwara	19	5

Experiments with cholera bacteriophage were continued in Assam and the Madras Presidency. No definite conclusions have been arrived at either for or against the value of bacteriophage when used alone on a large scale as a preventive of cholera.

In North Arcot district, in Madras Presidency, experiments were continued in 1934 in villages having wells as exclusive sources of drinking water supplies, in order to determine the prophylactic and curative value of bacteriophage, the dosage being increased to nine times the dose used in 1933.

The provisional conclusions may be summarised as follows :—

(1) Prophylactic administration of 'phage appeared to be effective in reducing the incidence rate.

(2) 'Phage administered prophylactically did not show any reduction on the mortality rate.

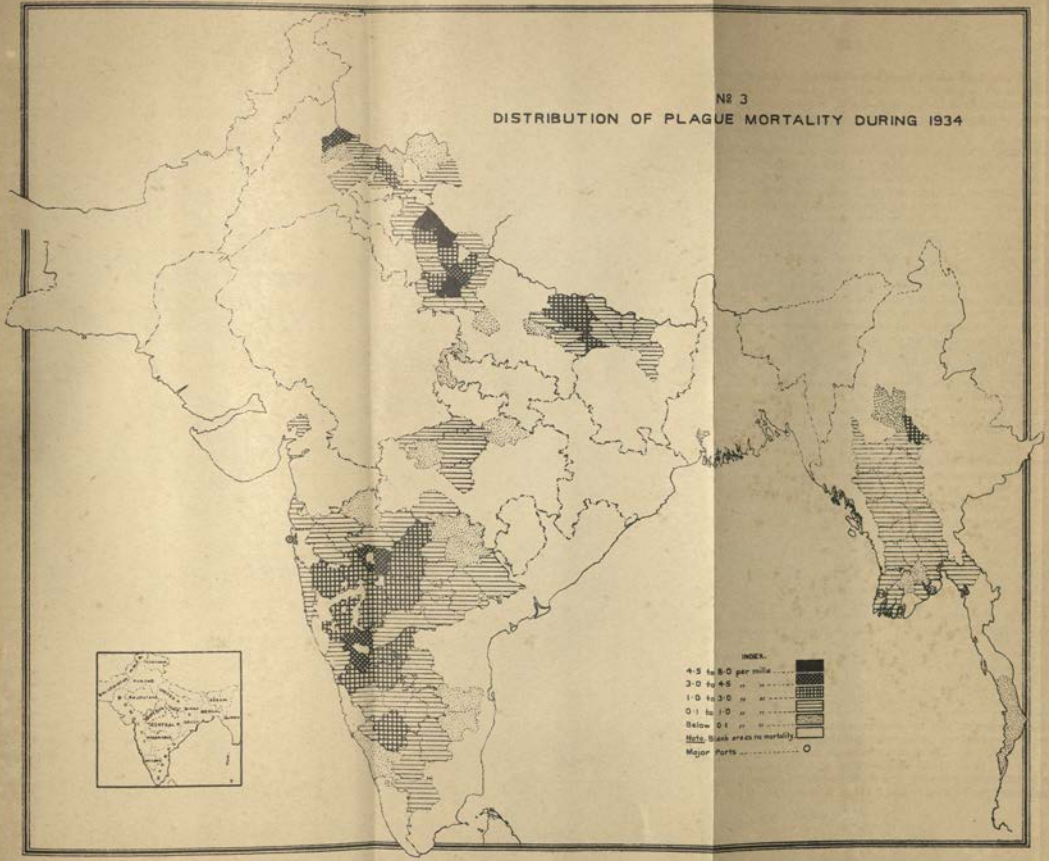
(3) The superiority of the curative value of bacteriophage over prodiarrhoea mixture was not established.

Plauge.

(*a*) *General.*

15. The provisional figures for 1934 which were available, when the 1933 report was published, indicated a rise in plague incidence in its northern endemic home. The final figures now available show that both morbidity and mortality were higher than in the preceding two years, cases and deaths increasing from 93,122 and 42,631 in 1933 to 103,271 and 80,131 respectively.

Whilst increased mortality was reported in all provinces except Madras, C. P. and Coorg, the death rate for British India as a whole, *viz.* 0·3 p.m. was still well below the decennial mean of 0·5 p.m. The most noteworthy feature of the epidemic was, that the disease again remained confined to its important haunts in the provinces of Northern India, which suffered heavily as is evident from Chart No. 5. The increase was particularly important in the U. P. where no less than 47,688 deaths (60% of total plague deaths) as against 9.835 in 1933 were recorded. In other parts of Northern India, 8,069 deaths were reported in the Punjab and 5,411 in B. & O. The N.-W. F. P. remained


№ 3
DISTRIBUTION OF PLAGUE MORTALITY DURING 1934
INDEX.
4·5 to 8·0 per mille
3·0 to 4·5 " "
1·0 to 3·0 " "
0·1 to 1·0 " "
Below 0·1 " "
Note. Blank areas no mortality
Major Ports

free while Delhi reported two deaths and Bengal one. In the Punjab the sub-montane districts of Gujrat and Hoshiarpur returned 80% of the total deaths in that province. The principal plague foci in the U. P. included the western districts of Dehra Dun and Saharanpur and the eastern districts of Ballia, Gorakhpur, Basti and Azamgarh; Etah and Aligarh in the Agra division; Bijnor, Badaun, Moradabad and Bareilly in the Rohilkhund division. These 12 out of 48 districts in the whole province reported 43,904 deaths or 92% of the total. In B. & O. the incidence was mostly confined to the endemic foci in the districtsof Muzaffarpur, which alone contributed one-third of the total deaths, Saran and Darbhanga. In certain isolated tracts in these districts the disease starts on the approach of the winter, reaches its maximum intensity during February and March and subsides with the advent of summer.

The position in the Deccan Plateau comprising the C. P., the Bombay and Madras Presidencies was not so bad. Compared with 1933 and the quinquennial mean, the recorded death rates in these provinces were lower except for an increase in the Madras Presidency. The most heavily infected districts in the Bombay Presidency were, as usual, Dharwar, Satara, Bijapur and Belgaum, which together contributed 11,159 deaths or 80% of the provincial total. Those in Madras Presidency included Bellary and Madura which registered 1,933 deaths or 82% of the provincial total. In the C. P., where the case mortality was 14%, the incidence was mild. The increase in Burma of 1,346 deaths is significant, more than doubling the previous year's figure.

The intensity of the epidemic in Indian States was less severe this year and 92% of the total deaths were registered in the Hyderabad and Mysore States and in the states in Bombay Presidency. Details of mortality for Indian States are included in Appendix II (page 302).

Except in Burma the female death rate was higher than the male in all provinces. Map No. 3 showing the distribution of mortality by districts during 1934 has again been included and should be consulted for further details, but it continues to confirm the comparative freedom of the whole eastern seaboard of India, of northern Burma, Assam, Bengal, the south eastern parts of Bihar, the western areas of the Punjab and Upper Sind.

Table II (*x*) gives the numbers of deaths and rates *per mille* in British India and in individual provinces for the period, 1931-34.

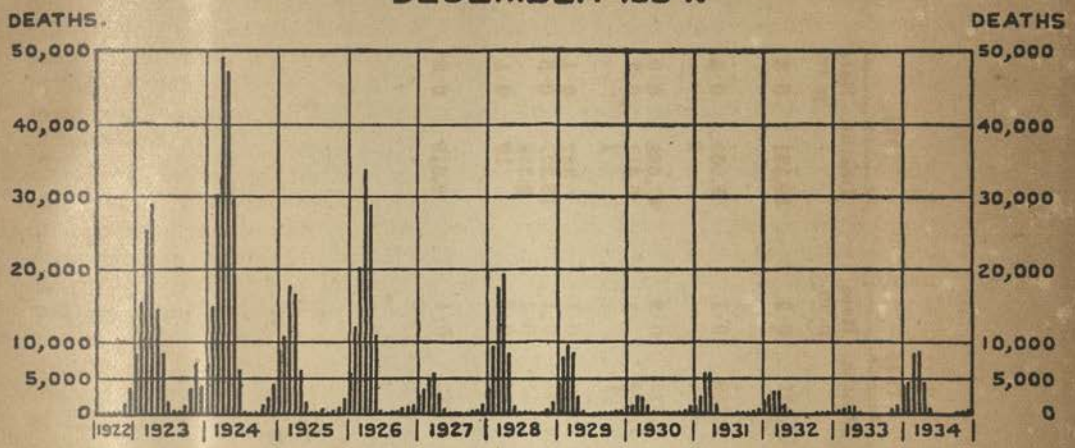
Table II (*xi*) gives details of cases by quarters for the different provinces. With the change of the centre of intensity of infection to northern India the maximum mortality was recorded in March and the minimum in July. Detailed figures showing seasonal mortality for the different provinces are given in Appendix II (page 302).

TABLE II (*x*).

	1931.		1932.		1933.		1934.		Mean (1929-33).	
	Deaths.	Rate p. m.	Deaths.	Rate p. m.	Deaths.	Rate p. m.	Deaths.	Rate p. m.	Deaths.	Rate
British India	45,626	0·2	46,504	0·2	42,631	0·2	80,131	0·3	46,418	0·2
N. W. F. P.	..	..	..	..	..	..	..	..	..	..
Punjab	1,150	..	2,003	0·1	1,789	0·1	8,069	0·3	1,510	0·7
Delhi	1	..	..	..	..	..	2	..	..	..
U. P.	31,225	0·6	21,497	0·4	9,835	0·2	47,688	0·9	22,219	4·5
B. & O.	5,429	0·1	3,374	0·1	1,635	..	5,411	0·1	4,562	0·1
Bengal	1	..	1	..	1	..	1	..	1	..
C. P.	1,649	0·1	2,058	0·1	1,200	0·1	967	0·1	1,716	0·1
Bombay	3,506	0·2	14,446	0·7	24,560	0·1	13,307	0·6	13,110	4·5
Madras	1,073	..	1,561	..	2,591	0·1	2,358	..	1,697	0·4
Coorg	25	0·1	8	..	48	0·3	10	0·1	17	0·9
Assam	..	..	..	..	..	..	..	..	..	..
Burma	1,574	0·1	1,556	0·1	972	0·1	2,318	0·2	1,586	0·1
Ajmer-Merwara . . .	..	..	..	..	..	..	..	..	..	..

No. 5

PLAGUE DEATHS REPORTED IN NORTHERN INDIA,* BY FOUR-WEEK PERIODS, FROM JULY 1922 TO DECEMBER 1934.



* N.W.F.P., Punjab, Punjab States, U.P., B. & O., and Kashmir.

NOTE:- Reproduced from the League's Weekly Epidemiological Record dated 23rd August 1934. No. 34. (R.H. 443) and other League's publications.

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Table II (x_i).

	1st Quarter.		2nd Quarter.		3rd Quarter.		4th Quarter.		Total.	
	1933.	1934.	1933.	1934.	1933.	1934.	1933.	1934.	1933.	1934.
Total	20,955	58,651	7,688	19,323	25,740	10,745	38,739	14,549	93,122	103,271
Punjab, Delhi and Punjab States	364	4,032	1,990	5,479	26	..	724	142	3,104	9,653
Bengal	1	...	...	...	..	..	..	..	..	..
U. P.	1,807	18,936	1,496	8,396	97	206	1,854	1,342	5,254	28,860
B. & O.	708	1,708	75	826	32	55	180	242	995	2,831
C. P.	1,161	4,864	207	222	1,646	640	6,073	1,528	9,087	7,254
Bombay	8,238	10,400	1,693	1,063	11,013	3,847	15,023	4,638	35,967	19,948
Madras	1,302	2,101	213	115	2,373	1,081	1,889	855	5,777	4,152
Burma	475	1,657	107	178	246	296	463	284	1,291	2,415
Hyderabad State . . .	4,006	8,724	969	1,154	5,315	2,057	6,764	2,793	17,054	14,728
Mysore State	781	1,653	323	185	1,642	1,381	2,072	1,136	4,818	4,355
Bombay Presidency States .	1,653	2,560	522	491	3,213	1,027	3,403	1,275	8,794	5,353
Other Indian States . . .	457	1,966	93	1,287	137	155	294	314	981	3,722

Whilst the rural populations suffered more in the Punjab, the U. P., B. & O. and Bombay, the urban centres in the C. P., Madras, Coorg and Burma reported the higher mortality. Table II (*xii*) gives deaths and their rates *per mille* in rural and urban areas in each province for the years 1933 and 1934.

TABLE II (*xii*).

	Rural.				Urban.			
	1933.		1934.		1933.		1934.	
	Deaths.	Rate p. m.	Deaths.	Rate p. m.	Deaths.	Rate p. m.	Deaths.	Rate p. m.
British India	38,448	0·2	72,008	0·3	4,183	0·2	8,128	0·3
N.-W. F. P.	..	..	..	..	..	..	..	..
Punjab	1,680	0·1	7,751	0·4	109	..	318	0·1
Delhi	..	..	..	..	..	..	2	..
U. P.	9,299	0·2	44,247	1·0	536	..	3,441	0·9
B. & O.	1,617	..	5,294	0·2	18	..	117	0·1
Bengal	..	..	..	..	1	..	1	..
C. P.	1,029	0·1	670	..	171	0·1	297	0·2
Bombay	22,051	1·2	11,858	0·6	2,509	0·6	1,449	0·3
Madras	2,284	0·1	1,599	..	307	..	759	0·1
Coorg	14	0·1	2	..	34	3·5	8	0·8
Assam	..	..	..	..	..	..	..	..
Burma	474	..	582	..	498	0·3	1,736	1·2
Ajmer-Merwara	..	..	..	..	..	..	..	..

Research work.—This has been reviewed on page 208.

(*b*) *Provincial.*

N. W. F. P.—This area remained free for the seventh year in succession.

Punjab.—As already mentioned, the upward tendency of the mortality curve evidenced towards the last quarter of 1933, persisted throughout the first half of 1934. This not only marred the comparative quiescence enjoyed since 1928, but the abrupt rise of the curve to 8,069 deaths as against 1,789 in 1933 foreshadows the possibility of a severe outburst of the disease. The infection flared up in the sub-montane districts of Gujrat and Hoshiarpur, two of the notorious centres of endemic infection, which recorded 3,469 and 2,863 deaths respectively. Fourteen other districts were also involved, the numbers of deaths in those badly affected being 124 in Jullundur, 283 in Gurdaspur, 427 in Sialkot and 625 in Amritsar.

The peak was reached in May, with 2,788 deaths or nearly 35% of the total, September recording the lowest mortality. Cases continued to occur in one or the other part of the province throughout the year, Hoshiarpur being the only district which reported infection at the time of the close of the year (40 deaths in December). In regard to this district, the D. P. H. remarks :—

"Infection has become almost endemic in Hoshiarpur district now and has formed a focus which under favourable meteorological conditions would be capable of infecting the surrounding districts also. The apathy and indifference engendered by familiarity with the disease in this endemic area together with the density of the population characteristic of the district makes the problem of the control of infection very difficult."

Rural areas suffered more than urban. The female death rate, 0·4 p.m. as usual exceeded the male rate, 0·3 p. m.

Delhi.—Only four imported cases, of which two were fatal, were recorded in Delhi city.

U. P.—Like the Punjab, this province experienced the severest epidemic during the last quinquennium. The death rate was nearly five times that in 1933 and double the 5-year mean. As usual, the months of January, February and March showed increased mortality, the peak occurring in March with 14,087 or nearly 30% of the total deaths. The mortality curve fell steadily during the following three months until the minimum was reached in July (61 deaths). In December infection flared up again and 1,374 deaths were reported of which 506 or 37% occurred in Gorakhpur district. The main foci of infection included the rural areas of Saharanpur (7,929 deaths), Bijnor (5,196), Etah (4,992), Budaun (3,500), Moradabad (3,652), Basti (3,198), Gorakhpur (7,649) Azamgarh (1,642), Ballia (1,423) Bareilly (1,386), Aligarh (1,503) and Muzaffarnagar (1,834) districts. Female deaths were 130 for every 100 of males. The death rate in rural areas was slightly higher than that in urban.

B. & O.—Although an upward trend in the mortality curve was recorded, the infection remained confined to the endemic foci. The death rate, which was 2½ times that of 1933, was still half the decennial mean. In this province, there are certain isolated tracts in the districts of Muzaffarpur, Saran, Darbhanga and Northern Monghyr where the disease starts with the approach of the winter, reaches its maximum intensity during February and March and subsides with the advent of summer. In these four districts nearly the whole mortality occurred, the death rates p.m. being 0·6, 0·6, 0·4 and 0·2, respectively. The rest of the province, except for 107 deaths in the district of Champaran and 13 in Shahabad, remained entirely free. Of the total deaths 86% occurred in the months of January to April.

Bengal.—Only one death occurred in April in Howrah town.

C. P.—The downward tendency, which was a feature of the mortality curve last year, was continued, the infection being mainly confined to the districts of Hoshangabad, Yeotmal, Chhindwara and Nagpur, which together were responsible for 97% of the total deaths. In the districts of Betul, Mandla and Buldana, only sporadic cases were reported.

Attacks and deaths numbered 6,976 and 967, giving a case mortality of 14%.

Bombay.—There was a reduction in plague mortality, but the death rate in infected areas was as high as 5 p.m., the provincial rate being 0·6 p.m.

The D. P. H. says :—

" .....it will be seen that since 1917 in which year the highest mortality from plague was registered, there is definite decline in the incidence of the disease. The decrease is on the whole progressive ; epidemic waves continue to occur but the peaks do not reach the height of the former severe epidemics ".

As in 1933, practically the whole mortality, *i.e.*, 12,276 deaths or 92% of the total, was reported from the Southern Registration District, but the death rate there (2·2 p.m.) remained below that for 1933 and the quinquennial mean. The worst affected districts were Dharwar with 3,716 deaths, Satara 2,633, Bijapur 2,542 and Belgaum 2,268. In the Central Registration District 858 deaths were registered. The Northern and Sind Registration Districts remained free except for 142 deaths in Kaira district in the former. Thirty-one deaths were recorded in Bombay city.

Madras.—The incidence was mild. Bellary and Madura were the only districts severely affected, returning 1,933 or 82% of the total deaths. Seven other districts were also mildly infected, but the number of deaths did not exceed 154 in any one.

Cases of pneumonic plague occurred in the districts of North Arcot and Chittoor, infection in both cases being imported from Mysore State.

Assam.—As usual remained free.

Burma.—The death rate was 0·11 p. m. higher than that in 1933 and 0·05 p.m. more than the five-year mean. Of the total, 1,736 deaths or 75% occurred in towns. Mandalay town alone contributed 918 or nearly 40% of the total provincial mortality and recorded a death rate of 6·8 p. m., nearly thrice the quinquennial average. In other districts the incidence of mortality was mild or sporadic. As usual, the sea-board districts of Arakan, Tavoy and Mergui remained free; as also Pyapon and Lower Chindwin districts. Among rural districts, Sagaing, which has been infected each year during the last two decades, was most heavily infected, 21 village tracts being involved; the recorded attacks and deaths in this district numbered 131 and 101, respectively. The disease is also endemic in Meiktila district which reported 119 attacks and 86 deaths.

(*c*) *Anti-plague measures.*

Inoculation.—Table II (*xiii*) gives the numbers of anti-plague inoculations performed in the various provinces. These, as a routine, are performed in the infected localities and their numbers depend on the severity of the epidemic.

TABLE II (*xiii*).

	1933.	1934.
N. W. F. P.	..	145
Punjab	133,747	807,823
Delhi	..	39
U. P.	99,983	329,959
B. & O.	25,154	97,506
C. P.	51,500	44,917
Bombay	559,723	276,375
Madras	129,191	123,938
Coorg	15,961	4,432
Burma	70,924	103,667
Ajmer-Merwara	..	..

Rat destruction : *Punjab.*—The Local Government gave a grant-in-aid of Rs. 5,570 for extensive deratting operations in Gujrat district and Rs. 9,200 in the Hoshiarpur district. Cyanodust, *bhoosa batties* and barium carbonate pills were used.

Delhi.—Systematic rat-killing was continued both in rural and urban areas, especially in grain and food markets and 416,516 and 354,461 rats, respectively, were destroyed in these areas. Expenditure in rural areas totalled Rs. 13,942, in urban areas Rs. 23,346.

U. P.—Altogether 889,180 rats were killed by means of barium carbonate in 19 districts, 40 municipalities and several notified areas and other towns.

C. P.—Rats destroyed totalled 609,829 at a total cost of Rs. 36,194. Temporary plague regulations under the Epidemic Diseases Act were enforced in the districts of Nagpur, Chhindwara and Nimar and in 13 towns.

Bombay.—Field trials of cyanogas fumigation as a plague preventive measure were begun during 1934. Altogether 10,000 lbs. of cyanogas "A" were purchased for supply at cost price to local bodies and for experiments. In Bijapur town 1,858 lbs. were used in the fumigation of 213 godowns, 250 shops and 349 dwelling houses. Before entry into the town, loaded carts from infected localities were fumigated under tarpaulins.

Madras.—Encouraged by previous results, it was decided to conduct a scheme of cyanogas fumigation in the districts of Coimbatore, Salem, Bellary and Anantapur and in the municipalities of Hospet and Bellary at a cost of Rs. 8,800, to be borne partly by the local government and partly by the local bodies concerned.

Studies on plague problems were continued at Cumbum, but the year, 1934, did not offer favourable opportunities owing to the absence of a definite offseason (April-July). Evidences of epizootics in rats were obtained in 3 villages during routine examinations. A method of examining specimens by means of group animal tests was attempted, which proved very useful as compared to the usual smear examination and helped in the detection of villages threatened with infection and in the organisation of preventive measures, such as cyanogas fumigation. Altogether 4,887 specimens of house rats (*R. rattus*), bandicoots (*B. malabarica*) and house mice (*M. urbanus*) which were the species chiefly concerned in local epizootic plague were examined both singly by smears and also by animal group tests. Three positive results by the former and 12 positives by the latter method were obtained. Of 154 carcasses of rodents examined, 81 were found positive. Resolving plague lesions were noted in a few specimens of *R. rattus, Mus urbanus* and *Bandicota Malabarica,* but virulent *B. pestis* could not be isolated from any. Of 3,005 wild rodents examined, only two *Golunda ellioti,* obtained a mile away from Cumbum town, gave evidence of plague. Although *X. astia* was found to be the predominating flea infesting all species of field rats, *X. cheopis, Stivalius ahalae* and *Ctenocephalus* fleas were also obtained from these field rodents. Experiments regarding the rôle played by *Ctenocephalus* in the transmission of plague gave negative results, but these were found to retain viable *B. pestis* for as long as 8 days after infection. The carry-over experiments in model houses were repeated and infected fleas were given occasional short feeds on normal Madura rats introduced in cages and removed before they could develop septicaemia. This test proved plague transmission by fleas at intervals of 16-30 days after the original infection.

Rat flea surveys were continued. *X. cheopis* was, as before, found to predominate during all months, the index varying from 3·3 in September to 1·2 in April. *X. braziliensis* was found for the first time in the Cumbum Valley in one of the frontier camps at an elevation of about 5,000 ft. Repeated attempts were made to detect loose fleas in grain consignments at the Kumili frontier but were all negative, perhaps due to the fact, that most of these consignments were ex-rat proof godowns at Cumbum. However the possibility of such transference of fleas was indirectly proved on three occasions by artificially infesting grain carts with fleas and recovering over 50% of them after a night's journey. The possibility of importation of fleas in grain is

further demonstrated by finding heavy *cheopis* infestation of rats in the northern half of the Plermade taluk, adjoining the Cumbum Valley, which was conspicuously absent in the southern half. The study of the climatology of rat burrows showed that their atmosphere was only slightly affected by the large diurnal variations outside and that their saturation deficiency was uniformly low compared with that of outside air, thus providing conditions uniformly favourable for *cheopis* multiplication and survival of infected fleas.

Further work on cyanogas fumigation of rat burrows was continued. All villages, reporting rat falls, were promptly fumigated and infection was either aborted or the epidemic considerably delayed. Better results were obtained in small villages because more thorough work was possible in a limited time. Altogether 183,807 rat holes in 25 different localities comprising 15,535 houses were fumigated. Attempts were also made to evolve a suitable method for the disinfection of grain consignments under field conditions. Tarpaulin sheets were used to cover the consignments which were fumigated by cyanogas or calcid. The chief difficulty, *viz.*, rendering the tarpaulin airtight, was remedied by smearing with crude oil. It was found that period of exposure was important than concentration or dosage of gas, three hours exposure being generally sufficient, provided the floor was dry.

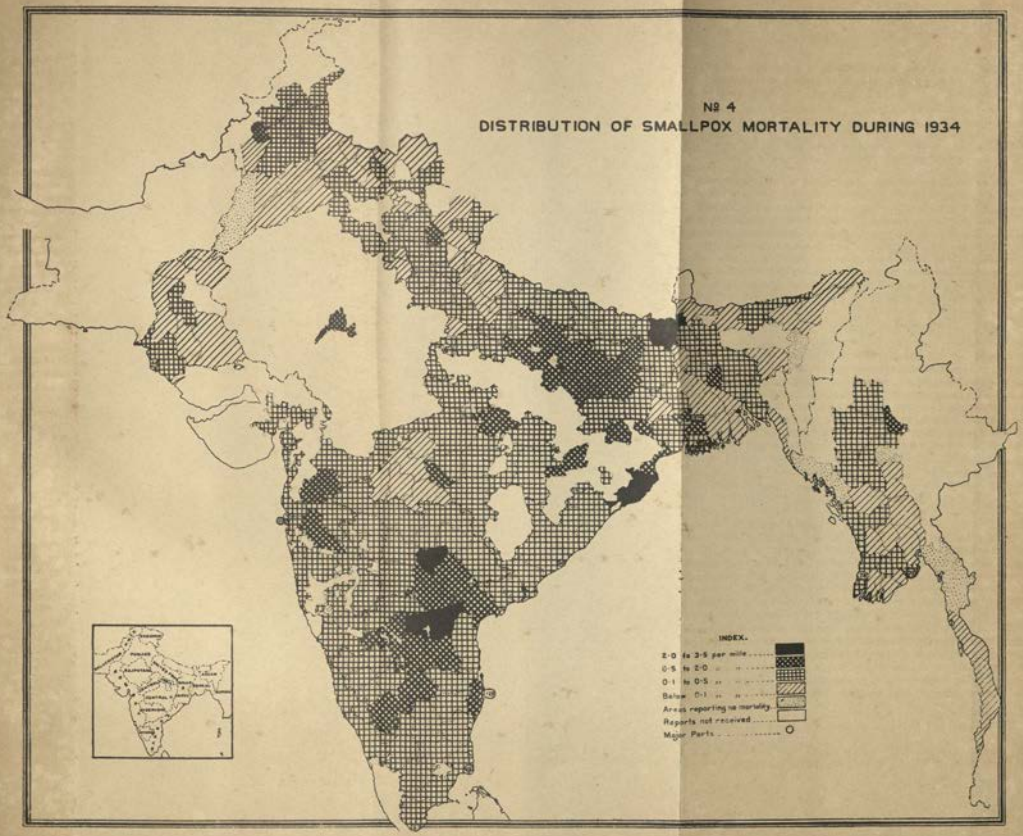
Burma.—Of 802,185 rats killed, 734,689 or over 91% of the total were in Rangoon. The only other towns practising rat killing were Minbu, Syriam, Moulmein and Henzada. Except in the Hlegu rural health unit and in the districts of Myaungmya and Katha, rat trapping was not carried out in rural areas. Fumigation of rat burrows was carried out with cyanogas, first in Mandalay and later in 44 municipalities and 19 rural districts. In Mandalay alone, 43,500 rat holes in 5,920 premises were dealt with.

Tmallpox.

(*a*) *General.*

16. The disease was moderately prevalent this year. Reported cases rose by 4% from 250,366 in 1933 to 261,242 whilst the deaths dropped from 103,641 in 1933 to 83,928 and the death rate from 0·4 p. m. to 0·3 p. m. The quinquennial mean, 1930-34, is the second lowest in the last half century. The epidemic wave that reached its crest in 1926 and 1927 with death rates of 0·48 and 0·49 p. m. has been followed by a trough with falling rates of 0·40 p. m. in 1928, 0·30 p. m. each in 1929 and 1930 and 0·1 p. m. in 1931 rising again to 0·2 p. m. in 1932, and 0·4 p. m. in 1933, the rise being interrupted in 1934 by a drop to 0·3 p. m. The provisional data for the first 6 months of 1935 show resumption of the rise. The striking feature of Table II (*xiv*) below is that the severe outbreaks which characterised the years, 1877-1900, are now rare. The downward trend of the mortality curve since 1920 is encouraging. What is required further is an extension of compulsory vaccination to all areas, rural as well as urban, and the wide practice of revaccination at school age.

The degree and duration of immunity against smallpox conferred by infant vaccination has been investigated at the Belgaum Vaccine Institute and found to be much shorter than was formerly believed, *viz.* 4 years in 1/5 of the children and 7 years in half. In India the facilities for vaccination are


№ 4
DISTRIBUTION OF SMALLPOX MORTALITY DURING 1934
INDEX.
2·0 to 3·5 per mille
0·5 to 2·0
0·1 to 0·5
Below 0·1
Areas reporting no mortality
Reports not received
Major Ports

excellent. Governments or local authorities maintain adequate staffs of vaccinators throughout the country and all may obtain vaccination, and revaccination free. In spite of this, the disease remains endemic in the country and is responsible for something like 1·2% of all deaths.

The continued prevalence of this easily preventible disease is a measure of the passive resistance to public health improvement, which every health officer knows so well.

TABLE II (*xiv*).

	Average Number of deaths.	Mean rate p. m.
1880—84	154,933	0·8
1885—89	79,344	0·4
1890—94	81,447	0·4
1895—99	89,444	0·4
1900—04	88,264	0·4
1905—09	111,276	0·5
1910—14	74,790	0·3
1915—19	87,071	0·4
1920—24	56,415	0·2
1925—29	98,051	0·4
1930—34	68,516	0·3
1930	72,813	0·3
1931	37,272	0·1
1932	44,925	0·2
1933	103,641	0·4
1934	83,928	0·3

Except for small increases in the U. P., the C. P., Madras Presidency and Coorg, all provinces recorded low death rates. Centres of infection included the 4 districts of Allahabad, Azamgarh, Fyzabad and Benares in the U. P., these contributing 38% of the total deaths. Madras Presidency had a fairly severe epidemic and the mortality was the highest since 1926, the districts of Kurnool, Guntur, South Arcot, Tanjore, Cuddapah, Anantapur and Bellary recording nearly 51% of the total deaths.

The decreases in the N. W. F. P., the Punjab, Delhi, B. & O., Bombay Presidency and Ajmer-Merwara were notable. In the N. W. F. P. the case mortality was 50%, in the Punjab the mortality was the lowest since 1923, although the infection lingered on throughout the year; in Delhi owing

to the epidemic in 1933 and the large number of vaccinations performed then, there were only a few sporadic cases this year.

Table II (*xv*) gives the total smallpox deaths, death rates and rates of successful vaccination per 1,000 of the population for British India and the individual provinces.

TABLE II (*xv*).

	Deaths.			Death rate p. m.			Rate of successful vaccinations per 1,000 of population.	
	1933.	1934.	Mean (1929-33.)	1933.	1934.	Mean (1929-33.)	1934-35.	1933-34.
British India	**103,641**	**83,923**	**66,307**	**0·4**	**0·3**	**0·3**	**51**	**52**
N.-W. F. P.	1,532	615	553	0·7	0·3	0·2	59	86
Punjab . .	11,626	1,692	6 712	0·5	0·1	0·3	85	91
Delhi . .	948	23	358	1·4	..	0·5	38	42
U. P. . .	9,844	14,817	7,755	0·2	0·3	0·2	33	32
B. & O. . .	42,674	30,810	16,259	1·1	0·8	0·4	35	37
Bengal . .	15,426	8,293	12,844	0·3	0·2	0·3	80	80
C. P. . .	561	2,282	2,413	..	0·1	0·2	38	37
Bombay . .	7,741	5,516	8,858	0·4	0·2	0·5	35	34
Madras . .	10,745	18,088	7,700	0·2	0·4	0·2	44	45
Coorg . .	14	45	13	0·1	0·3	0·1	109	69
Assam . .	247	206	866	..	..	0·1	56	55
Burma . .	1,506	1,601	1,448	0·1	0·1	0·1	56	54
Ajmer-Merwara	777	438	528	1·4	0·8	0·1	48	44

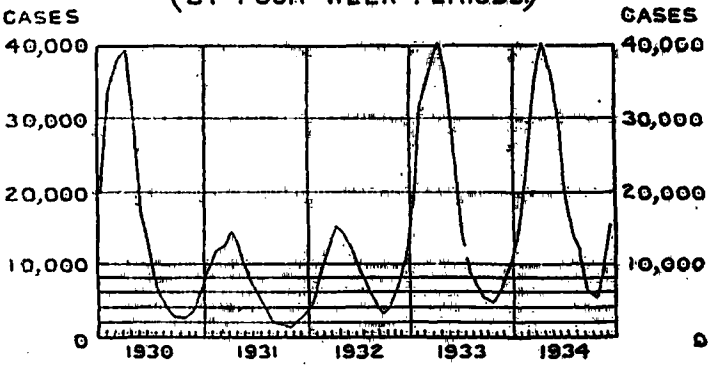
Case mortality, which was low this year being 32% as against 41% in 1933, compares unfavourably with Siam, Egypt, Ceylon, Norway, Japan and England and Wales in which countries it was 20%, 19%, 18%, 11%, 11% and 3% respectively.

Map No. 4 shows the geographical distribution of smallpox mortality in India during 1934 and chart No. 6 demonstrates the periodicity of the disease during the last 4 years. The peak of the mortality during 1934 occurred in April and May; the minimum in September and October. Details of seasonal incidence in each province are included in Table E on page 303. Reported cases during each quarter are given in Table II (*xvi*).

№ 6

CASES REPORTED DURING THE YEARS 1930–1934

(BY FOUR-WEEK PERIODS.)



NOTE.- Reproduced from the league's Weekly Epidemiological Record for February 14th, 1935 R.H. #468.

ROYAL ASIATIC SOCIETY OF THE BOMBAY BRANCH OF THE ROYAL ASIATIC

TABLE II (*xvi*).

	1st Quarter.		2nd Quarter.		3rd Quarter.		4th Quarter.	
	1933.	1934.	1933.	1934.	1933.	1934.	1933.	1934.
Total .	**95,948**	**80,923**	**105,074**	**109,470**	**26,568**	**39,421**	**22,776**	**31,428**
N.-W. F. P. .	1,095	**615**	1,159	**343**	468	**190**	539	**203**
Kashmir .	87	..	..	**109**	..	..	..	..
Punjab . .	12,291	**985**	6,858	**979**	1,477	**267**	598	**349**
Punjab States .	109	**35**	266	**69**	36	**16**	20	**248**
Delhi . .	3,855	**7**	519	**22**	14	**9**	..	**11**
U. P. . .	4,089	**4,495**	6,168	**7,114**	651	**1,228**	746	**1,914**
B. & O. . .	27,311	**23,002**	43,576	**23,751**	7,147	**6,895**	5,273	**4,850**
Bengal . .	12,600	**6,536**	13,329	**6,610**	1,901	**1,305**	1,800	**810**
Bengal States .	98	**106**	46	**211**	100	**31**	50	**163**
Madras . .	12,485	**21,801**	10,080	**22,454**	8,605	**11,016**	8,190	**9,323**
Hyderabad .	1,947	**5,551**	1,310	**15,298**	683	**8,293**	599	**4,578**
Mysore . .	415	**411**	838	**1,563**	219	**1,789**	156	**1,819**
Bombay . .	11,716	**7,911**	11,074	**9,273**	3,006	**3,182**	2,481	**4,250**
Bombay States	263	**800**	1,023	**857**	442	**581**	211	**457**
Assam . .	190	**105**	247	**89**	61	**38**	19	**6**
Burma . .	4,136	**1,543**	3,740	**2,817**	610	**611**	414	**216**
Other Indian States.	2,296	**1,873**	2,294	**1,519**	514	**170**	734	**1,064**
Ajmer-Merwara	65	**125**	452	**82**	43	**8**	8	**17**
C. P. . .	567	**2,592**	1,170	**6,639**	379	**1,680**	333	**508**
C. I. Agency .	333	**2,449**	925	**6,621**	212	**2,292**	605	**642**

The smallpox situation in the first half of the year was on the whole an improvement on the corresponding period of 1933, especially in Northern India including the Ganges Valley. The only areas recording increased incidence were the Central Provinces, the Central India Agency, Hyderabad State and Madras Presidency. During the period, July to September, the incidence dropped throughout India, and remained low during the last 3 months except for small increases in Bombay Presidency and Hyderabad State.

In so far as the figures can be trusted, Table II (*xvii*) indicates the deficiencies in infant and child vaccination throughout the provinces. Low mortality of infants is a feature in Assam, B. & O., Burma, Bengal and Delhi while the rates calculated *per mille* of population give a more accurate representation of the incidence of child mortality from this disease.

TABLE II (*xvii*).

	Deaths.		% of total smallpox deaths.			Death rate *per mille* of population.		
	Under 1 year.	1—10 years.	Under 1 year.	1—10 years.	Total.	Under 1 year.	1—10 years.	Total.
British India . .	16,033	22,280	19	27	46	1·7	0·3	0·5
N.-W. F. P. . .	162	324	26	53	79	2·2	0·5	0·7
Punjab . . .	514	740	30	44	74	0·5	0·1	0·2
Delhi . . .	3	13	14	59	73	0·1	0·1	0·1
U. P. . . .	4,316	5,587	29	38	67	2·4	0·5	0·7
B. & O. . . .	2,455	5,138	8	17	25	1·9	0·5	0·7
Bengal . . .	377	966	12	4	16	0·3	0·1	0·1
C. P. . . .	822	1,011	36	44	80	1·2	0·3	0·4
Bombay . . .	1,604	2,594	29	47	76	2·1	0·5	0·7
Madras . . .	5,593	5,516	31	30	61	3·4	0·5	0·8
Coorg	17	5	38	11	49	4·1	0·1	0·6
Assam . . .	15	14	7	7	14	0·1	...	...
Burma . . .	155	372	10	23	33	0·4	0·1	0·2

Although this year, the rural death rate exceeded the urban in N.-W. F. P., B. & O., and Ajmer-Merwara, the town dwellers in British India as a whole were more severely infected. In the Punjab the rural and urban rates were equal. Table II (*xviii*) compares the death rates in rural and urban areas in the different provinces during the years 1933 and 1934.

TABLE II (*xviii*).

	Rural.				Urban.			
	1933		1934		1933		1934	
	Deaths.	Rate p.m.	Deaths.	Rate p.m.	Deaths.	Rate p.m.	Deaths.	Rate p.m.
British India .	82,154	0·3	71,415	0·3	21,537	0·8	12,513	0·4
N.-W. F. P. .	1,283	0·6	574	0·3	249	0·8	41	0·1
Punjab . .	9,980	0·5	1,501	0·1	1,646	0·5	191	0·1
Delhi . .	85	0·4	1	..	863	1·9	21	..
U. P. . .	7,450	0·2	12,792	0·3	2,394	0·6	2,025	0·5
B. & O. . .	40,232	1·1	29,434	0·8	2,442	1·7	876	0·6
Bengal . .	9,928	0·2	6,798	0·1	5,498	1·5	1,498	0·4
C. P. . .	446	..	1,171	0·1	115	0·1	1,111	0·6
Bombay . .	3,807	0·2	3,651	0·2	3,934	0·9	1,865	0·4
Madras . .	7,206	0·2	14,251	0·4	3,539	0·6	3,837	0·6
Coorg . .	14	0·1	41	0·3	..	..	4	0·4
Assam . .	234	..	200	..	13	0·1	6	..
Burma . .	1,116	0·1	664	0·1	390	0·3	937	0·7
Ajmer-Merwara	323	0·8	337	0·9	454	2·5	101	0·6

(b) Provincial.

N.-W. F. P.—Prevalence was mild this year, although a higher fatality rate was recorded, *viz.* 50% as against 47% in 1933. Recorded cases and deaths totalled 1,227 and 615 in the settled districts as compared with 3,288 and 1,532, respectively, in 1933. Over 90% of the total deaths were reported in the districts of Peshawar, Bannu and Hazara. In Peshawar where 235 deaths were registered, about 58% were amongst children under 10 years of age. The other two districts reported light infection. Of the 104 cases and 33 deaths reported from the agencies, 50 and 18 occurred in South Waziristan ; 23 and 8 in Malakand ; 20 and 6 in Kurram and 11 and 1 in Chitral.

Punjab.—Recorded mortality was the lowest on record since 1923. The decline from September to November was conspicuous. Every district reported infection except D. G. Khan on the south-west border along the Indus but the highest death rate of 0·5 p.m. was reported in Hoshiarpur.

Delhi.—Only sporadic infection was recorded, due partly to the large number of vaccinations performed in 1933 and partly to the elimination of many susceptible persons during the last years epidemic.

U. P.—Although the number of deaths recorded from this disease by the ordinary agencies was 14,817, the data furnished after verification again indicated a much lower figure (2,285). Further investigation is required to reveal the truth. The fact that nearly 30% of the total smallpox mortality occurred among infants and 40% among children, aged 1-10 years, points to poor vaccination. Altogether 619 registration circles, out of a total of 1,166 in the province, reported deaths.

B. & O.—The lower death rate recorded during 1934 follows the epidemic of the previous year. Rural areas suffered more than the urban areas, the districts of Cuttack and Purnea being chiefly involved.

Bengal.—Compared with 1933 and the quinquennial mean, the death rate during 1934 fell by 33·3%. With 806 deaths in January, smallpox prevalence rose steadily to its maximum in April (1,597 deaths). From May it tended to decline, reaching its lowest in October, but in December the curve rose again. Compared with 1933 and the previous decennium, the death rate in 1934 was lower in every month. Calcutta was responsible for 1,074 or 72% of the 1,498 deaths recorded in the whole urban population.

C. P.—Compared with 1933, a higher incidence was recorded. Since nearly 80% of the total deaths from smallpox occurred among children, 36% among infants and 44% among children, aged 1-10, it is evident that primary and re-vaccination are neglected. Berar division reported a low mortality, elsewhere the quinquennial mean was exceeded. The D. P. H. has reasons to believe that many deaths recorded as due to chickenpox were actually cases of smallpox. He suspects that " there was a good deal of suppression of information and concealment with regard to this disease. "

Bombay.—The highest incidence was reported in the Central Registration District where 2,684 deaths (0·4 p.m.) were recorded, Nasik district being the chief sufferer with 1,172 deaths. The Southern Registration District registered 1,365 deaths of which 494 and 326 deaths, respectively, occurred in the districts of Satara and Belgaum. The Northern Registration District returned 1,106 ; Sind 209 ; and Bombay city 152 deaths. Continued high mortality among children, aged 1-10 years, *i.e.*, 76% of the total, stress the

necessity for a more vigorous vaccination campaign; this view is further confirmed by the high female death rate of 0·3 p. m. as compared with 0·2 p. m. among males.

Madras.—A fairly severe epidemic of smallpox occurred in this presidency and the number of deaths (18,088) and the death rate (0·4 p. m.) were the highest on record since 1926. Over 38% of the deaths were registered in the districts of Guntur, South Arcot, Tanjore, Cuddapah, Anantapur and Bellary. The D. P. H. has compiled a statement giving the number of attacks and deaths from smallpox in 8 districts and the case mortality rates arranged according to the number of vaccination marks. This is reproduced below as Table II (*xix*).

The figures, so far as they go, do not indicate any advantage in multiple insertions.

TABLE II (*xix*).

Number of marks.	Attacks.	Deaths.	Percentage of deaths to attacks.
Nil	6,474	1,510	23·3
1	1,465	63	4·3
2	1,951	88	4·5
3	1,176	48	4·1
4	2,396	68	2·8

In commenting on the infantile and child mortality from smallpox, the D. P. H. says—

"The percentage of deaths from smallpox under one year has fallen during the decade though the fall has not been steady. The percentage of mortality in the age-period one to ten years does not show any definite trend, while in the age-period above 10 years there is a noticeable increase in the percentage of mortality during the period. As the total number of deaths during 1925-34 is less than that during 1915-24, the increased percentage of deaths in the age-period above 10 years does not mean that the number of men protected is less than that in the previous decade, but that the degree of immunity in the adults is less than that in the infants. This shows the need for re-vaccination among the adults. Re-vaccination has been made compulsory throughout the Presidency in all the *compulsory* areas except the town of Madras. It is understood that compulsory re-vaccination will be introduced into the town of Madras also."

Coorg.—Of the 17 infant deaths due to smallpox 6 were among males and 11 among females; all the 5 deaths among children, aged 1-10 years, were among females.

Assam.—In this province the gradual fall in mortality from this disease is attributed to prompt preventive measures taken to deal with isolated small outbreaks and to the thoroughness with which vaccination is carried out. The death rate of 0·03 p. m. was nearly one twelfth of the decennial mean (0·34 p. m.). Only 87 out of 28,333 villages and 49 of the 147 rural circles in the province reported infection; the highest death rate recorded in any district was 0·08 p. m. in Kamrup and 0·07 p. m. in Darrang.

Burma.—Owing to the widespread prevalence of smallpox, involving 29 districts, the incidence was slightly in excess of the rate for 1933 and the quinquennial mean. The seasonal distribution of most of the cases was, as usual, from March to May, the lowest figure being recorded in October. Over 67% of the cases were among people over 10 years of age. The D. P. H. says that "It is reasonable to believe that many of these were vaccinated in childhood and the figure shows how necessary it is in this province to get people revaccinated in order to keep up immunity against the disease".

The urban death rate was 11 times that in rural areas. Among rural areas, Sagaing district to which the Vaccination Act was applied only during the year under review, reported the highest incidence of 642 cases with 156 deaths in 86 out of 287 villages in the district.

(c) *Isolation hospitals.*

In British India there are no hospitals reserved exclusively for the isolation of smallpox patients or accommodation provided for their contacts. Such information, as is available of the vaccinal history of smallpox cases treated in infectious diseases or other hospitals or contagious diseases or isolation wards in civil hospitals, etc., is given in Table II (*xx*).

The vaccinal condition of cases treated in medical institutions in Bengal is included in Table II (*xxi*.)

TABLE II (*xx*).

	Smallpox patients.	One or more vaccination scars.	Stated to have been successfully vaccinated but no vaccination scar present.	Stated to have been unvaccinated or vaccinated unsuccessfully but no vaccination scar present.	Previously unvaccinated but vaccinated during incubation of smallpox.	Stated to have been successfully re-vaccinated.
Total	2,385	1,312	230	739	8	85
U. P.	352	220	6	124	..	2
Bengal	631	257	36	309	8	21
C. P.	216	129	3	22	..	62
Bombay	187	91	83	13	..	..
Madras	505	313	102	90	..	..
Assam	13*	2	..	..	..	..
Burma	481	300	..	181	..	..

* Particulars re: 11 cases not available.

TABLE II (*xxi*).

Vaccinal condition of patients treated at medical institutions in Bengal.

Districts.	Total number of admissions from smallpox.	Number vaccinated as shown by the presence of one or more vaccination cicatrices.	Number stated to have been successfully vaccinated but bearing no vaccination cicatrices.	Number stated to be unvaccinated or vaccinated unsuccessfully bearing no vaccination mark.	Number previously unvaccinated but vaccinated during incubation of smallpox.	Number stated to have been unsuccessfully revaccinated.	Type.					Age				
							Modified.	Discrete.	Confluent.	Semi-confluent.	Hæmorrhagic.	Under 1 year.	1 year and under 10.	10 years and under 20.	20 years and under 30.	Upwards.
Total	631	257	36	309	8	21	107	184	219	77	44	5	34	125	284	183
Burdwan	62	22	14	18	4	5	18	29	5	9	2	1	13	20	23	6
Hooghly	22	...	...	16	...	6	15	...	4	...	1	...	...	2	16	4
Howrah	20	5	6	9	...	...	1	3	11	4	1	...		2	11	7
Calcutta (Campbell Hospital)	438	186	4	239	2	7	27	139	183	64	37	3	14	89	195	137
Nadia	3	1	...	...	2	...	2	...	1	...	...	...	1	...	...	2
Murshidabad	4	3	...	1	...	...	3	1	...	...	...	1	...	...	3	...
Khulna	4	2	...	2	...	...	1	1	1	...	1	...	...	...	4	...
Dinajpur	7	7	...	...	...	...	1	4	...	2	...	...	...	1	2	3
Jalpaiguri	1	1	...	...	...	...	1	...	...	...	...	...	...	...	...	1
Darjeeling	7	4	1	2	...	...	3	4	1	...	...	...	1	...	4	...
Pabna	2	...	2	...	...	...	...	...	1	1	...	...	...	...	...	1
Dacca	18	9	2	7	...	...	14	3	...	...	1	...	...	1	10	3
Mymensingh	15	6	4	5	...	...	9	5	1	...	...	...	2	3	6	4
Bakarganj	18	3	3	10	...	2	7	...	11	...	...	...	2	5	7	4
Chittagong	1	...	...	...	...	1	1	...	...	...	...	...	...	...	...	1
Tippera	8	8	...	...	...	...	3	4	...	...	1	...	1	2	3	2

Fevers.

(a) *General.*

17. A total of 3,957,077 deaths was ascribed to this cause, against 3,530,299 in 1933 and 3,662,565, the decennial mean. Of this total, 2,917,817 deaths or 74% were recorded in northern India comprising the N.-W. F. P., Punjab, Delhi, U. P., B. & O. and Bengal. As usual, the Madras and Bombay Presidencies, Burma and Assam recorded low mortality. In rural areas 3,761,695 deaths were registered and 195,241 in urban areas, as against 3,349,586 and 180,713, respectively, in 1933; male deaths were 2,062,076 and female 1,895,001. As usual, rural rates much exceeded urban in all provinces. The female death rate was higher than the male in the Punjab, Delhi, Bombay Presidency and Coorg.

Table II (*xxii*) on page 57 gives an analysis of the "fevers" figures for certain provinces.

(b) *Provincial.*

N.-W. F. P.—The death rate was 16·8 p. m. or slightly lower than the quinquennial mean. Maximum mortality occurred in January and February with 4,674 and 4,305 deaths, respectively, and the minimum in July with 2,593 deaths. The districts of D. I. Khan, Bannu and Kohat recorded the highest death rates.

Punjab.—The fever death rate of 20 p. m. was in excess of that for 1933 and the quinquennial mean. The highest mortality was registered in December and January suggesting a high incidence of pneumonia at this time, a feature common to the Punjab and the N.-W. F. P. An unusually large number of fever deaths in May calls for comment.

Delhi.—The death rate exceeded the quinquennial mean by 1·6 p.m. The rural and urban rates were 27 p. m. and 12 p. m., respectively. Maximum mortality occurred in September and October; also in June.

U. P.—The death rate was higher than that in 1933 and the quinquennial mean. The peak was reached in May and the minimum in February in contrast to the Punjab and N. W. F. P. The district of Bulandshahr again recorded the highest death rate of 34 p. m., being 7 p. m. in excess of the rate for 1933. Both the rural and urban death rates were high.

B. & O.—The death rate was well in excess of the rate for 1933 and the decennial mean, the rise being in the rural areas. The urban population recorded a low death rate compared with the decennial average. Maximum mortality was recorded in September and minimum in February.

Bengal.—Fevers accounted for 65% of the total mortality. The death rate was reduced by 6% as compared with that in 1933, but still remained 5% in excess of the quinquennial average. From a maximum of 100,288 deaths in December, 1933, the mortality curve fell to a minimum of 47,607 deaths in June, 1934. Autumnal prevalence of fevers was low this year. Sixteen districts registered rates in excess of the provincial mean; 6 districts headed by Birbhum (26 p.m.) returned rates between 20 p.m. and 26 p.m., Calcutta recording the lowest mortality.

C. P.—Fever deaths increased by 70,268 in the year, the highest number being recorded in September (32,776) and October (31,727) and the lowest in January (18,736) and February (17,813). The districts of Raipur and Bilaspur suffered most.

Bombay.—The incidence of fevers was higher than in 1933 but was well below the average of the previous five years. High urban death rates continued to be recorded in the Presidency proper. The district mortality varied between 17 p.m. in East Khandesh and 9 p.m. in Poona. Maximum mortality occurred in March and minimum in June.

Madras.—Although the number of deaths increased by 24,868 or by 8%, the death rate remained below the quinquennial mean. The highest mortality was recorded in August and the lowest in June. Districts returning high fever death rates included East Godavari, Vizagapatam, Ganjam, Kurnool and Bellary, the death rates varying between 18 p.m. and 11 p.m. Low mortality in Tanjore district was continued. The rural rate was again nearly double that for urban areas.

Assam.—Fevers accounted for 65·4% of the total provincial mortality (64·5% in 1933). The death rate, which was lower than in 1933, was still in excess of the decennial mean. Highest mortality occurred in June and the lowest in March. Goalpara district again reported the highest death rate of 22 p.m., and the lowest of 9 p.m. was recorded in Nowgong district.

Burma.—Of the total deaths, 38% were ascribed to fevers. The death rate showed an increase of 0·7 p. m. over the rate for 1933 and of 0·9 p.m. over the quinquennial mean. The largest number of deaths was reported in December and the lowest in June. The rural death rate was nearly thrice the urban rate, the districts reporting the highest mortality, being Shwebo 16 p.m., Minbu 15 p. m., Tavoy, Akyab and Prome 13 p. m. each, Mandalay 12 p.m. and Pakokku 11 p. m.

TABLE II (*xxii*).

		Enteric fever.		Malaria.		Relapsing fever.		Kala-azar.		Measles.		Other fevers.	
		Deaths.	Rate p.m.	Deaths.	Rate p.m.	Deaths.	Rate p.m.	Deaths.	Rate p.m.	Deaths.	Rate p.m.	Deaths.	Rate p.m.
Delhi	R.	66	0·3	28	0·1	..	..	..	..	..	..	5,273	25·5
	U.	284	0·6	47	0·1	..	..	..	..	13	..	4,426	9·6
	Total	350	0·5	75	0·1	..	..	..	..	13	..	9,699	14·5
U. P.	R.	6,102	0·1	853,477	18·3	499	..	382	..	12,763	0·3	43,337	0·9
	U.	2,041	0·5	19,579	5·0	114	..	41	..	3,277	0·8	28,677	7·3
	Total	8,143	0·2	873,056	17·3	613	..	423	..	16,040	0·3	72,014	1·4
Bengal	R.	7,995	0·2	384,376	8·1	2,717	0·1	14,124	0·3	3,670	0·1	336,995	7·1
	U.	1,759	0·5	2,815	0·8	3	..	639	0·2	275	0·1	9,124	2·6
	Total	9,754	0·2	387,191	7·6	2,720	0·1	14,763	0·3	3,945	0·1	346,119	6·8
Bombay	R.	5,469	0·3	28,000	1·5	..	..	..	..	1,666	0·1	144,095	7·8
	U.	1,215	0·3	2,893	0·7	..	..	..	..	1,150	0·3	16,025	3·7
	Total	6,684	0·3	30,893	1·4	..	..	..	..	2,816	0·1	160,120	7·1
Coorg	R.	..	..	..	..	..	..	..	..	2	..	2,738	17·7
	U.	..	..	..	..	..	..	..	..	..	..	63	6·6
	Total	..	..	..	..	..	..	..	..	2	..	2,801	17·1
Burma	U.	267	0·2	1,604	1·1	..	..	9	..	29	..	2,579	1·8

R.=Rural. U.=Urban.

Malaria.

(a) *General.*

18. Apart from deaths in hospitals and dispensaries, information as to mortality from malaria is scanty and unreliable. The statistical value of even the recorded deaths in medical institutions is vitiated by the fact that only a minority are treated by practitioners of modern medicine. Registration of the cause of death remains largely guess work in the rural areas, where malaria is most prevalent and where there are few registered medical practitioners. There has been for long a general belief that approximately 1/3 of all deaths recorded as due to "fevers" are in fact due to malaria. Enquiries recently made from D. P. Hs. of provinces indicate very general agreement that this estimate is not an over-statement of the position.

Probable malaria mortality calculated on these estimates together with the recorded deaths has been included in Table II (*xxiii*).

TABLE II (*xxiii*).

	Estimated deaths from malaria.	Deaths recorded by ordinary agency.
Total	**1,319,026**	..
N.-W. F. P.	8,175	..
Punjab	161,461	..
U. P.	407,521	873,191
B. & O.	227,932	..
Bengal	252,272	387,191
C. P.	120,848	285,017
Bombay	34,239	30,893
Madras	65,010	..
Assam	50,889	..
Burma	37,667	..

These figures exclude the mortality caused by malaria indirectly and this is believed to be fairly high. The debilitating effects of malaria are partly responsible for the exceedingly high mortality recorded as due to influenza, pneumonia, dysentery, etc.

Lt.-Colonel Sinton, Director of the Malaria Survey of India has recently dealt with the malaria problem in India in three* papers published in the Records of the Malaria Survey of India for September and December, 1935 (Vol. V, Nos. 3 and 4 and Vol. VI, No. 1). His main theme is "What malaria costs India, nationally, socially and economically". He has described the effects of malaria upon: (*i*) natural increase of the population, (*ii*) health, vitality and physical development of the population, and (*iii*) social, intellectual and political progress. He has also dealt with the financial loss, direct and indirect, which malaria causes to India and with anti-malarial measures as paying propositions as well as with the prevalence of the disease, in its relationship to the problems of food supply and increasing population in India.

He summarises the position in regard to mortality from malaria in the following tentative conclusions:—

* Records of the Malaria Survey of India, Vol. V, Nos. 3 and 4; Vol. VI, No. 1. Thackers Press and Directories Ltd. Calcutta, price Rs. 3 per copy.

"(1) In ordinary years, malaria is responsible directly for at least 1,000,000 deaths each year, and, in years when severe regional epidemics occur, this figure may be increased by another quarter to half a million. The fatal effects of the disease fall chiefly on children and infants. The local distribution of the mortality may be markedly increased by conditions of economic stress."

"(2) Apart from direct mortality due to malaria, it has also a marked indirect action by lowering the general vitality of its victims, whereby many of them become more liable to contract other diseases, from the effects of which many of them die at a later date."

"(3) There seems little doubt that malaria, by its combined direct and indirect actions, is responsible for at least 2,000,000 deaths each year in India."

There is some reason to believe that not more than 1/10th of the persons suffering from malaria in India actually receive treatment in hospitals and dispensaries. If this be so, then the total cases of malaria must have been over 110 millions in 1934. The Director of the Malaria Survey of India considers "there is very considerable evidence to show that, at least, 100,000,000 individuals suffer yearly from malaria in British India alone, and that this is probably a moderate estimate. In addition to these, there is an indirect morbidity predisposed to by this disease which may be between 25 and 75 million cases".

Major-General Sir John Megaw, late Director-General, I.M.S. on the basis of an enquiry made by him in 1933 from medical officers stated "the number of persons who suffer every year from malaria in India is not less than 50 millions and may easily exceed 100 millions in some years".

Table II (*xxiv*) gives hospital attendances for malaria by provinces for 1933 and 1934.

TABLE II (*xxiv*).

	Cases.		Percentage to total cases treated.	
	1934.	1933.	1934.	1933.
Total . .	**11,356,538**	**12,602,145**	**15·0**	**16·8**
N.-W. F. P. .	**544,696**	627,024	**25**	29
Punjab . .	**2,174,764**	3,062,837	**14**	20
Delhi . .	**129,063**	165,439	**14**	15
U. P. . .	**1,091,195**	1,076,445	**12**	13
B. & O. .	**1,016,176**	882,463	**14**	12
Bengal . .	**3,098,353**	3,424,800	**31**	34
C. P. . .	**390,042**	386,142	**11**	11
Bombay .	**693,587**	690,551	**22**	18
Madras . .	**1,094,553**	1,050,146	**6**	6
Coorg . .	**99,922**	98,760	**32**	29
Assam . .	**617,763**	737,721	**26**	30
Burma . .	**406,424**	399,817	**12**	12

Whether the figures in Table II (*xxiv*) are reliable or not, the fact remains that of all diseases, this is the most general cause of human distress and economic loss in India.

From a study of the following paragraph it will be seen that whilst large parts of India are malarious, all are not equally so. The plains of central and western Bengal, most of Assam, the Dooars, the Terai of the U. P., the hilly submontane slopes of the eastern and western *ghats* are all very malarious places, whilst the plains of the U. P. and the Punjab, though they may be at times extremely malarious, are not always so. Malaria rarely occurs in the hills above 5,000 feet but several of the most malarious parts of India are in the valleys running into the hills at a level of 1,500 to 2,000 feet.

Now that the Sind Malaria Enquiry is drawing to a close, it is possible to give some conclusions on the effects produced by the operation of the Lloyd Barrage scheme on the incidence of malaria in Sind. These have been summarised in a paper which has been prepared for publication in the records of the Malaria Survey of India by Covell and Baily as follows :—

"(1) Before the Lloyd Barrage Scheme commenced operations, many parts of Sind were highly malarious, and the province was subject to periodical epidemics of malaria, more especially affecting the northern areas. The contention put forward in certain quarters that most, if not all of the malaria now existing in Sind is due to the operation of the Barrage Scheme, is thus unsupported by facts.

(2) Nevertheless it is a fact that malarial conditions in Sind have become considerably worse since the Barrage Scheme began to operate, and we consider that this is due mainly to conditions brought about by the operation of the Project.

(3) The principal factors which have produced this adverse effect are :—

(*i*) A rise in the subsoil water level in many areas.

(*ii*) Actual or threatened water-logging of the soil in certain areas.

(*iii*) Seepage from some of the new canals.

(*iv*) The cutting off of sections of certain of the old canals thus forming prolific anopheline breeding grounds.

(*v*) The formation of a "lake" above the Barrage, with a corresponding rise of the subsoil water level along the course of the Indus.

(*vi*) An extension in rice cultivation in areas outside the Barrage Command in northern Sind, due to the increased supply of water made available by the presence of the Barrage lake, and the remodelling of pre-existing canals.

(4) The future course of events as regards the incidence of malaria depends on the degree of success attained by the Irrigation Department in providing efficient drainage, and preventing the evils of water-logging.

(5) It is strongly urged that increased facilities for the treatment of malaria be provided throughout the area affected by the Barrage Scheme.

(6) We recommend that where possible all rest-houses provided for officials touring in Sind be rendered mosquito proof and equipped with electric light and fans.

(7) Attention is drawn to the importance of making a soil and subsoil survey of the area involved, as well as providing an efficient scheme of drainage, before any large irrigation project is undertaken."

(*b*) *Provincial.*

N.-W. F. P.—The incidence of malaria was not severe. The seven municipal towns recorded 74 deaths including 39 in Peshawar and 29 in Bannu. In Peshawar district alone 184,585 cases were treated in hospitals and dispensaries while the special malaria staff treated 1,809 in the rural areas, 79,262 cases in Hazara, 65,802 in Bannu and 51,993 in Kohat. In other districts the infection was mild.

Punjab.—The usual malaria forecast issued on September 15th predicted localised epidemic foci of mild intensity in parts of Gurgaon, Karnal, Ambala, Ferozepore, Sialkot, Gujranwala, Gujrat, Shahpur and Attock districts. The forecast proved fairly accurate.

Only in 13 municipal towns, having full time M. O. Hs. were deaths from malaria recorded, the figures being 411 deaths in all, of which 183 were in Kasur town and 71 in Multan.

Delhi.—The incidence of malaria is high in many rural tracts particularly in the riverine areas, the spleen index in some places being as high as 80%. The eastern zone near Jumna river and the northern zone irrigated by the western Jumna canal are heavily infected, the rocky areas in the southern zone are less affected, and the sandy tracts in the western zone are little affected. Recorded deaths (75) are a gross underestimate owing to defective registration. No less than 129,063 patients attended hospitals and dispensaries on account of malaria during the year.

U. P.—Nearly 90% of the total fever mortality in the province was classified as malaria, but the incredibility of this high figure is strengthened by a knowledge of the present defective registration of cause of death. On investigation into the reporting of excessive malaria mortality in the municipal towns of Fyzabad, Badaun, Moradabad, Muttra and Mirzapur indicated that malaria mortality was exaggerated by 20% to 30%. Probably the same would apply to many other centres.

Districts which reported epidemic malaria were Benares, Ballia, Gorakhpur, Muzaffarnagar, Muttra, Allahabad, Saharanpur, Meerut and Bulandshahr where 1 in every 10 villages was affected. The outbreak was widespread in the districts of Gorakhpur and Muzaffarnagar, due to extensive floods in the former and waterlogging in the Ganges and the Jumna *Khadirs* in the latter. In other districts outbreaks were localised and in Muttra, only the canal zone near Kosi was involved. In the Sarda canal area, the average spleen rate was 9·2% in villages under canal irrigation and 5·4% elsewhere. The areas along the main Hardoi canal branch in the Shahjahanpur and Pilibhit districts were found to have developed hyperendemic conditions and spleen rates varied from 60% to 100%. The spleen census in 28 districts having health organisations showed average rates of 3·1% in the spring and 3·3% in the autumn, as against 3·4% and 3·5% in 1933, the highest rates being in the districts of Nainital, Mirzapur and Bulandshahr.

B. & O.—Large portions of Orissa and the districts of Singhbhum, Purnea and North Bhagalpur are known to be malarious. Of 2,764 children examined in the districts of Muzzaffarpur, Darbhanga, Champaran, Purnea and North Monghyr, 72 or nearly 3% showed enlarged spleens, the rate varying from 17% in Muzaffarpur to 0·2% in North Monghyr.

Bengal.—Recorded deaths numbered 387,191, being 26,731 less than in 1933, and give a rate of 8 p.m. High death rates were recorded in Rajshahi (18), Nadia (16), Murshidabad, Birbhum and Malda (15 each), Jessore (14), Dinajpur, Pabna and Rangpur (13 each), Bogra (12) and Faridpur (10). Urban mortality decreased by 11% and rural by 6%. Maximum incidence occurred in October and November and minimum in February.

C. P.—Deaths totalled 285,017 or over 94% of the total fever mortality, giving a death rate of 18 p.m. The district of Raipur reported the largest number *viz.* 35,588, followed by Bilaspur 29,717, Drug 24,137, Hoshangabad 21,135, Saugor 21,060, Chhindwara 19,263, Bhandara 15,669 and Nimar 15,171 deaths.

Bombay.—A total of 30,893 deaths was recorded being 15% of the fever deaths for the Presidency. In Bombay city, with a census population of 1,161,383, only 97 deaths were registered. The provincial death rate was 1·4 p.m., the rural rate 1·6 p.m. and the urban rate 1·4 p.m.

Madras.—Large tracts in the districts of East Godavari, Vizagapatam, Ganjam and Kurnool are malarious. Continued high fever mortality in these districts has been mentioned in a previous paragraph.

Assam.—Malarial fever is by far the greatest scourge of this province. It is prevalent throughout and almost constantly present in epidemic form. A total of 665,983 cases was treated in the plains districts.

Burma.—Malaria continued to be the principal cause of ill-health and mortality in rural areas. In some parts the infection is widespread. It is known to be highly endemic in parts of the districts of Shwebo, Minbu, Tavoy, Akyab, Prome, Mandalay and Pakokku. A severe outbreak occurred in Hanthawaddy district in the Kyauktan, Thongwa, Kungyangone and Twante townships. In the urban areas, deaths from malaria totalled 1,604 with a death rate of 1·1 p.m., which was 0·07 p.m. less than that in 1933 and 0·35 p.m. lower than the quinquennial mean.

Anti-Malarial Measures.

19. Table II (*xxv*) shows the sums spent on these measures in nine provinces for which figures are available. Most of the expenditure was on quinine.

TABLE II (*xxv*).

	1930.	1931.	1932.	1933.	1934.
	Rs.	Rs.	Rs.	Rs.	Rs.
Delhi . . .	23,080	17,880	31,866	32,280	30,530
B. & O. . . .	2,500	2,500	..	..	..
Bengal . . .	2,10,488	2,02,579	1,90,350	3,03,503	3,00,000
C. P. . . .	43,738	45,323	31,621	48,912	41,821
Bombay . .	58,801	42,291	42,231	52,344	55,185
Madras . . .	47,692	54,176	28,028	45,822	56,681
Coorg . . .	18,450	11,824	6,719	6,951	6,975
Assam . . .	29,646	48,136	69,285	70,274	66,989
Burma . . .	40,682	41,000	43,155	43,419	46,872

Figures for other provinces are not available, but a total of Rs. 79,725 was spent in N.-W. F. P. and Rs. 4,35,305 in the Punjab during the last ten years.

The more important details of these measures carried out during 1934 in the various provinces are mentioned below :

N.-W. F. P.—The military authorities continued Paris green treatment of the cultivated lands in and near Peshawar and Kohat cantonments, other water collections being oiled.

Punjab.—On the basis of the malaria forecast arrangements were made for preventive measures, consisting chiefly of quinine distribution in the districts considered likely to be affected. Malaria surveys of certain areas in the districts of Mianwali, Gujranwala, etc. were conducted.

Delhi.—The measures carried out were similar to those of 1933.

U. P.—In the Banbassa headworks of the Sarda Canal, the usual "blanket" treatment referred to in previous reports was given to all residents, including newcomers. Malaria conditions in the Terai and Bhabar estates were reported on to the estate authorities. Field demonstrations on the use of Paris green were given and anti-larval measures carried out in 36 villages in these estates. Mass treatment of 25 villages was a feature in the autumn.

Advanced courses of instruction in malariology were given to 12 officers of the Public Health Department. Other instructional work included (*a*) a course in malariology to 7 candidates for the License in Public Health; (*b*) a short advanced course in practical anti-malarial methods to 9 candidates for the chief sanitary inspector's examination; and (*c*) a short course to 30 students for the sanitary inspectors certificate. Boy scouts and members of minor Red Cross groups numbering 9,355 were trained in the principles of causation and prevention of malaria at 156 centres, and these carried out minor anti-mosquito measures in various parts of the province. Model bye-laws were adopted in three more municipalities.

B. & O.—Treatment centres in Purnea town were continued. A field experiment carried out in Puri from October to December to demonstrate the effect of Paris green on the yield of paddy crops showed that 2% of Paris green, sprayed carefully after 4 p.m. during the fertilisation season was not injurious. The experiment also showed that paddy obtained from land, treated with Paris green, was not inferior to that obtained from the "control" plots.

Bengal.—In connection with the *A. ludlowi* menace in Calcutta, both survey and control work was continued. The malaria research laboratory at Saili Tea Estate in the Jalpaiguri Duars continued its study of the vector of malaria in the locality and of the seasonal infectivity rate. The examination of 1,740 mosquitoes of 12 different species showed *A. phillipinensis* and *A. minimus* to be the carriers.

C. P.—Routine anti-malarial measures were continued in Pachmarhi, Nagpur (civil station), Khandwa and Burhanpur. An epidemic dispensary was at work in the Melghat forest area and the adjoining *ryotwari* tract in Amraoti district.

Bombay.—Five specially trained medical officers were detailed during the malaria season for anti-malaria work. Altogether 4,199 villages were visited and 76,849 cases of malaria were treated. Of 87,153 children examined, 30,904 or over 35% had enlarged spleen.

Madras.—In addition to surveys of eight *taluks*, anti-larval measures were continued in seven centres in the Vizagapatam Agency. These have proved a great success and the spleen rate in some of these places has been markedly reduced. Quinine distribution has been dealt with in a later paragraph.

Coorg.—Systematic anti-larval measures were regularly carried out by the special malaria officer and his staff in Mercara, Virajpet and 13 other centres. In rural areas these measures were attended to by the Cooperative and village *Panchayat* staffs and quinine was distributed. Plasmoquine and atebrin were tried in Fraserpet.

Training in anti-malaria measures was given by the dispensary staffs to the public within their respective areas.

Assam.—A sum of Rs. 24,500 was provided by the local Government for anti-malarial measures in 32 different areas in the districts. With funds provided by the Government of India, anti-malarial measures were also carried out at Pasighat and two other places.

Burma.—In the Hanthawaddy district, which provides grounds for the breeding of *A. aconitus.* a special sub-assistant surgeon was detailed in affected areas and cinchona febrifuge was widely distributed. In addition, larvivorous fish, *H. panchax* and *gambusia affinis* was tried in village tanks breeding *A. aconitus.* Similar measures were also carried out in Shwebo district and Taungdwingyi township which areas did not experience severe malaria this season. In Kyaukpyu, Akyab, Lashio, Maymyo, Bhamo and Sahmaw, measures carried out included reclamation of borrow pits and lowlying areas, clearing and grading of drains, oiling and treatment with Paris green, jungle clearing, etc. The spleen rate in Kyaukpyu was further reduced, being 10·5% in June and 4·2% in December, that in Lashio was 22% in the "protected" area as against 40% before the commencement of control measures and 70% in the "unprotected" area; and that in Sahmaw was 24% as against 29% in 1933 and 73% five years ago.

Quinine.

20. Under present arrangements, the quinine and cinchona febrifuge requirements of Bengal, B. & O. and Assam and as well as the Indian States within their geographical limits are met from the Bengal Government Quinine Factory at Mungpoo. The Punjab and U. P. also obtain a part of their supplies from this factory. The main supplies for the Punjab, including its states and for the U. P., Rajputana, N.-W. F. P., Baluchistan, Delhi and Gwalior State come from the Government of India stock under the control of the Director, Botanical Survey of India (Calcutta). For the rest of British India and the remaining Indian States supplies are obtained from the Madras Government's factory at Naduvattam.

The issues from the Bengal Factory, during the year, 1934-35, are given in Table II (*xxvi*).

TABLE II (*xxvi*).

	Assam.	Bengal.	B. & O.	Other areas.	Total.
	lbs.	lbs.	lbs.	lbs.	lbs.
Quinine salts	1,647	9,562	1,538	231	12,978
„ Sulphate	91	2,925	25	73	3,114
„ tablets	3,888	71,802	2,917	366	78,473
	boxes.	boxes.	boxes.	boxes.	boxes.
Cinchona febrifuge	2,268	16,085	1,580	5,506	25,439
Cinchona and cinchonidine salts	..	..	11	13	24
Quinidine salts and quinodine	8	11	3	109	131
Cinchona bark	..	1,600	..	200,000 (to Madras Govt.).	201,600
Totaquina.	..	..	..	42	42

Issues from the Botanical Survey of India included 77, 351 lbs. of quinine sulphate and 2,718 lbs. of cinchona febrifuge.

The aggregate value of sales by the factory at Naduvattam, which had averaged Rs. 4,50,000 during the preceding three years, rose to Rs. 5,75,000 during 1934-35. The Madras Government have issued orders to limit quinine stocks at this factory to lbs. 18,500 which is considered to befar below the actual annual requirements and it is to be hoped that the local Government will raise the figure to 27,000 lbs. The total quantities of all cinchona products issued from the Naduvattam factory during 1934-35 are given in Table II (*xxvii*).

TABLE II (*xxvii*).

Details of Quinine Salts issued during the year, 1934-35.

Particulars.	Quinine sulphate.	Cinchona febrifuge.	Cinchona febrifuge. tablets.	Quinine sulphate tablets.	Quinine hydro-chloride.	Quinine bi-hydro-chloride.	Quinine bisulphate and tablets.	Totaquina and tablets.	Cinchona bark.
	lbs. oz.	lbs. oz.	lbs. oz.	lbs. oz.	lbs. oz.	lbs. oz.	lbs. oz.	lbs. oz.	lbs. oz.
Government hospitals . .	1,037 8	144 8	311 0	1,874 8	12 0	16 0	..	1,732 8	..
Local fund medl. institutions .	1,069 8	282 8	3 0	87 0	1 0	..	1 0	1,125 8	..
Municipal medical institutions .	379 0	43 8	..	..	10 8	..	..	128 0	..
Medical Store Depots—									
Madras	900 0	50 0	..	..	15 0	346 0	..	160 0	580 0
Bombay	4,800 0	300 0	..	..	50 0	550 0	..	550 0	300 0
Calcutta	..	..	..	..	..	..	..	470 0	..
Lahore	..	..	..	..	..	..	..	650 0	..
Assam	4 0	264 0	..	..	..	..	..	..	..
Burma	2,700 0	1,660 0	..	..	5 0	80 0	..	..	..
Bombay	3,835 0	200 0	..	..	310 0	..	..	..	..
United Provinces . . .	..	798 0	..	..	..	..	..	..	..
Central Provinces . . .	1,275 0	370 0	..	..	15 0	..	..	..	..
Coorg	168 0	112 0	103 0	97 0	..	..	..	20 0	..
M. & S. M. Railway . . .	120 0	30 0	300 0	..	..	..	..	..	..
Public	..	1,297 0	56 0	..	..	..	..	..	..
Local sales	117 0	473 0	12 0	11 4	..	..	160 8	67 8	..
Indian States—									
Hyderabad . . .	100 0	325 0	..	6 0	20 0	..	..	5 0	..
Mysore	310 0	1,020 0	..	..	..	..	..	..	..
Baroda	2,260 0	..	..	200 0	..	..	..	..	..
Travancore . . .	401 0	..	..	..	..	..	..		..
Cochin	..	..	..	..	..	..	..	..	..
Total .	19,476 0	7,369 8	785 0	2,275 12	438 8	992 0	161 8	4,908 8	880 0

Amounts of quinine, cinchona febrifuge, etc. sold or issued free from all sources during the year, 1934, are given in Table II (xxviii). Detailed consumption of these drugs per head of population in every district in British India, in so far as figures are available, is shown in Table M on pages 307—313.

TABLE II (*xxviii*).

Issues of quinine, cinchona febrifuge etc., from all sources during the year, 1934.

	Quinine.		Cinchona febrifuge.		Totaquina.	
	Sold. lbs.	Issued free. lbs.	Sold. lbs.	Issued free. lbs.	Sold. lbs.	Issued. free. lbs.
Total	**11,202**	**26,244**	**3,656**	**18,886**	**2,415**	**20**
N.-W. F. P.	..	1,185	..	991	..	..
Punjab	2,406	1,089	..	208	..	..
Delhi	..	307	..	238	..	..
U. P.	903	1,724	1,137	2,835	..	..
B. & O.	339	..	..	..	..	..
Bengal	..	14,080	..	12,253	..	..
C. P.	..	1,945	..	706	..	..
Bombay	..	2,994†	..	..	..	..
Madras	4,296	1,530	490	..	2,415	..
Coorg	26	306	..	215	..	20
Assam	227	1,001	102	1,276	..	..
Burma	3,005*	..	1,927	124	..	..
Ajmer-Merwara	..	83	..	40	..	..

*From the Medical Store Depot, Rangoon.

† In addition 7¾ lbs. were issued on railways presumably free; quinine worth Rs. 38,697 was sold.

N.-W. F. P.—Quinine and cinchona febrifuge were distributed free amongst the poor. Malaria carriers were treated with malaria and plasmoquine.

Punjab.—A total of 1,089 lbs. of quinine and 208 lbs. of cinchona febrifuge was distributed by the Public Health Department.

Delhi.—The total amounts of quinine and cinchona consumed during the year were 307 lbs. and 238 lbs., respectively. The low incidence of malaria in the endemic riverine tracts was ascribed to the distribution and consumption of quinine.

U. P.—The Government quinine tablet factory manufactured and issued 903 lbs. of quinine and 1,138 lbs. of cinchona and the total amount realised from sales was Rs. 33,872. To replenish stocks in 10 districts, 223 lbs. of cinchona were issued from reserve stock. The total consumption of quinine and cinchona per head varied from 0·18 grains in Azamgarh district to 18 grains in Nainital district.

In 9 districts, in which malaria epidemics occurred, 325 lbs. of quinine and cinchona tablets were distributed for the treatment of 48,537 cases. Free mass treatment with cinchona and plasmoquine was continued in 20 village groups in the districts of Lucknow, Hardoi and Unao and 1,649 cases were treated, the clinical seasonal relapse rate being 5·6 per cent as compared with 6·3 per cent. in 1933.

Ten lbs. of cinchona and 8,550 tablets of plasmoquine were supplied for "blanket" treatment courses in primary schools in Kosi notified area and 5 lbs. of cinchona and 300 tablets of plasmoquine in Brindaban.

A total of 37 lbs. of cinchona was distributed by the Shahjahanpur rural uplift association, and 21 lbs. of cinchona and 8 ounces of quinine by the *Taraqi Sabha*, Pilibhit district. A rural sale scheme of cinchona products, subsidised by local agencies was in operation in Gorakhpur district, 26 lbs. of cinchona tablets being sold.

B. & O.—A total of 339 lbs. of quinine in tablets form was sold through post offices principally in the districts of Purnea, Cuttack, Santal Parganas, Balasore, Bhagalpur and Muzaffarpur.

Bengal.—Altogether 8,589 lbs. of quinine were issued by the Public Health Department, the consumption varying between 3 grains per head in Chittagong to 0·2 grains in Howrah and Darjeeling.

C. P.—Altogether 1,900 lbs. of quinine sulphate, 570 lbs. of cinchona febrifuge and 25 lbs. of quinine hydrochloride were purchased from the Madras factory and supplied to the Nagpur jail factory for manufacture into tablets. Free distribution of quinine in hyperendemic areas in the districts of Betul, Mandla and Nimar was continued and steps were being taken to reach every village in the province.

Bombay.—In Sind, 585,800 five-grain and 2,446,300 two-grain quinine tablets were distributed free; in the Southern Registration district 205,066 five-grain and 164,999 two-grain tablets, in addition to 115,000 tablets issued by the revenue staff; and in the Central Registration district 125,028 five-grain and 147,375 two-grain tablets.

The local Government continued its grant of Rs. 30,000 for free distribution and Rs. 30,000 for sale of quinine sulphate, and Rs. 9,700 for cheap sale of quinine hydrochloride in treatment packets. Of these grants Rs. 30,973, Rs. 30,892 and Rs. 7,805 were actually expended. Quinine worth Rs. 22,528 and Rs. 20,639 was distributed free through district school boards and Assistant Directors and collectors, respectively. Following a malaria survey of the area surrounding Poona city, a six weeks course of treatment with plasmoquine was given to infected persons and beneficial results were reported.

Madras.—The Public Health Department made a free issue of 1,385 lbs. of quinine to 108,296 persons in 13 districts.

Coorg.—The distribution of quinine to school children and *ryots* was continued. In addition, limited supplies of atebrin and plasmoquine were used in selected areas.

Assam.—Up to June, quinine was sold at below cost price *i.e.*, at Re. 0-4-6 per treatment. From July, "quinine reinforced cinchona febrifuge" in tablet form was substituted and was sold at Re. 0-3-9 per treatment. Sales through post offices amounted to 7,965 parcels of quinine treatments, whilst 101 lbs. of quinine sulphate and 291 lbs. of cinchona were obtained for free distribution in the districts of Cachar, Sylhet, Goalpara, Kamrup, Darrang, Nowgong and Sibsagar.

Burma.—Cinchona febrifuge tablets continued to be manufactured at the Rangoon jail; 3,371,580 tablets were sold through treasuries and 208,980 were distributed free in 12 districts, 66 per cent. being issued in the districts of Chin Hills (54,000 tablets), Shwebo (45,360) and Hanthawaddy (37,620). The average provincial consumption per head of population was one grain, the highest being in Bhamo district (13·3 grains).

The districts, showing high fever mortality, are, those in which the consumption of cinchona febrifuge was generally low. For example, in Shwebo with a fever death rate of 16 p.m. consumption was only 0·55 grain per head. The figures in other fever districts were : Akyab 12 p.m. and 0·96 grain, Prome 12 p.m. and 0·53 grain, Pakokku 11 p.m. and 0·23 grain ; Sandoway 11 p.m. and 0·13 grain ; and Lower Chindwin 11 p.m. and 0·18 grain. In some other districts, *e.g.*, Minbu, with a fever death rate of 15 p.m., Tavoy (13 p.m.) and Mergui (11 p.m.), the consumption per head, though somewhat higher, was still far short of what is accepted as the minimum amount necessary to prevent or cure malaria.

Dysentery and Diarrhoea.

21. Owing to difficulties of diagnosis and inadequacy of medical supervision, especially in rural areas, dysentery and diarrhœa are classified together. The mortality from these diseases during 1934 continued to maintain the upward tendency evidenced during the previous year. The increase was reported chiefly in the U. P., B. & O., Bengal, C. P. and Bombay, registered deaths being 16 per cent. more than in 1933 and 18 per cent. more than the quinquennial mean. Mortality was especially high in the female population of Delhi, U. P., B. & O., Bombay and Ajmer-Merwara. Table II (xxix) gives the recorded deaths from dysentery and diarrhœa by sexes and by provinces.

TABLE II (xxix).

	Deaths.			Death rate *per mille*.			
	Male.	Female.	Total.	Male.	Female.	Total.	
						1934.	1933.
British India .	**148,316**	**136,794**	**285,110**	**1·0**	**1·0**	**1·0**	**0·9**
N. W. F. P. .	172	113	285	0·1	0·1	..	..
Punjab . .	6,627	5,784	12,411	0·5	0·5	1	1
Delhi . .	435	365	800	1·1	1·3	1	1
U. P. . .	9,294	8,846	18,140	0·3	0·4	..	..
B. & O. . .	12,463	11,018	23,481	0·6	0·7	1	..
Bengal . .	28,408	25,539	53,947	1·1	1·0	1	1
C. P. . . .	19,532	18,543	38,075	2·4	2·3	2	1
Bombay . .	13,686	12,615	26,301	1·1	1·2	1	1
Madras . .	50,155	47,689	97,844	2·1	2·0	2	2
Coorg . .	101	76	177	1·1	1·0	1	1
Assam . .	4,395	3,800	8,195	1·0	1·0	1	1
Burma . .	2,849	2,182	5.031	0·4	0·4	..	..
Ajmer-Merwara .	199	224	423	0·6	0·8	1	1

Conditions of urban life seem to favour the spread of these diseases and amongst such may be mentioned defective conservancy arrangements, bad water supplies and overcrowding of the city life. Except in Delhi Province, the urban death rate was as usual higher than the rural in every province. Table II (xxx) gives the rural and urban death rates during 1933 and 1934.

TABLE II (xxx).

	1934		1933.	
	Rural.	Urban.	Rural.	Urban.
British India	**0·9**	**2·1**	**0·8**	**1·7**
N. W. F. P.	..	**0·6**	..	0·6
Punjab	0·4	1·1	0·4	1·2
Delhi	0·5	1·5	0·6	1·1
U. P.	0·1	3·0	0·1	1·9
B. & O.	0·6	1·0	0·4	0·7
Bengal	1·0	2·2	0·8	1·9
C. P.	2·3	2·7	1·4	1·6
Bombay	1·1	1·4	1·0	1·2
Madras	2·0	2·7	2·0	2·8
Coorg	0·9	3·8	0·5	4·7
Assam	1·0	1·5	1·1	1·7
Burma	0·3	1·2	0·3	1·3
Ajmer-Merwara	..	2·3	..	2·1

Table II (xxxi) gives the number of deaths from this group of diseases for each quarter during the quinquennium, 1930-34. As usual, the third or monsoon quarter occasioned the largest number of deaths. Further details of mortality by months in British India and in provinces will be found in Appendix II (page 305).

TABLE II (xxxi).

	1930.	1931.	1932.	1933.	1934.
Total	**237,892**	**268,331**	**222,804**	**246,164**	**285,110**
1st Quarter	49,237	50,386	50,976	51,043	57,667
2nd Quarter	54,483	54,267	47,089	57,890	63,405
3rd Quarter	70,143	89,694	64,514	67,472	90,353
4th Quarter	64,029	73,984	60,225	69,759	73,685

In the *Punjab* the maximum mortality from dysentery and diarrhœa combined occurred during autumn and is said to be partly associated with the prevalence of malaria at that season. The sub-Himalayan districts of Simla, Kangra and Rawalpindi again recorded the highest mortality. The D. P. H. remarks that dysenteries are more common in the towns and no appreciable reduction of mortality from the disease is to be expected until conservancy methods are improved. He notes that most of the municipalities in the province which are content to entrust their conservancy arrangements to contractors record a comparatively higher dysentery death rate than those which carry out the work themselves. This is a common experience in towns in India and the moral is obvious.

In the *U. P.* maximum incidence occurred in August and minimum in February. The mountainous district of Garhwal, the submontane districts of Moradabad and Dehra Dun, also Lucknow and Benares reported the highest death rates. In *B. & O.* the death rate (0·6 p.m.) was higher than that in 1933 and the quinquennial mean, Orissa division registering nearly 80 per cent. of the total deaths. Compared with the average of the previous decennium, all districts in *Bengal*, except Calcutta and Jessore, returned a higher mortality, the largest increase occurring under dysentery in Darjeeling, a hilly district and under diarrhœa in Howrah. In the *C. P.*, the Berar districts recorded the largest number of deaths, 16,852 or 44 per cent. of the total, the death rates varying between 6·2 p.m. in Akola and 3·2 p.m. in Yeotmal district. In *Bombay Presidency* the highest mortality occurred in August and September; and in *Madras Presidency* in January, August and December. In the latter province, the highest death rate was reported from the districts of Nilgiris (3·5 p.m.) and Madura (3·7 p.m.). The districts returning the highest mortality in *Assam* were again Sibsagar (2·2 p.m.), Lakhimpur (2·0) and Darrang (1·3). The effect of bacteriophage on the incidence of these diseases in Nowgong district " does not appear to be very striking ". In *Burma* the largest number of deaths occurred in July and August and the lowest in February.

Such figures as are available for dysentery and diarrhœa separately are given in Table II (xxxii).

TABLE II (xxxii).

	Deaths from diarrhœa.	Death rate p. m.	Deaths from dysentery.	Death rate p. m.
Punjab	1,368*	4	712*	2
Delhi	541	1	259	..
U. P.	10,401	..	7,739	..
Bengal	24,273	1	29,674	1
C. P.	31,362	2	6,713	..
Bombay	22,380	1	3,921	..
Coorg	66	..	111	1
Assam	75†	..	184†	1
Burma	966‡	1	807‡	1

* For 13 towns having whole time M. O. Hs.

† For 13 large towns.

‡ For towns only.

Enteric Fever.

22. Table II (xxxiii) gives the numbers of cases treated in hospitals and dispensaries in the different provinces.

TABLE II (xxxiii).

	1934.	1933.
British India	**86,044**	**72,804**
N.-W. F. P.	1,845	1,290
Punjab	22,841	21,626
Delhi	841	1,118
U. P.	10,007	6,372
B. and O.	8,537	6,481
Bengal	13,625	12,446
C. P.	2,142	1,672
Bombay	6,401	5,266
Madras	17,699	14,344
Coorg	143	85
Assam	516	503
Burma	1,377	1,350
Baluchistan	**Not available.**	251

N. W. F. P.—Thirty deaths, with a rate of 0·1 p. m., were registered in municipal towns.

Punjab.—Of the 610 deaths notified in 13 municipal towns, which record them, 175 deaths were in Kasur and 150 in Multan.

Delhi.—The disease is said to be endemic in the urban areas, particularly in Delhi city where it is ascribed to infected water supply, contaminated food and flies. Verified deaths in these areas totalled 424, of which 400 occurred in Delhi city, 19 in New Delhi and 5 in the Notified area. In the rural areas, the disease is not notifiable. Table II (xxxiv) gives deaths by months.

TABLE II (xxxiv).

	Delhi City.	New Delhi.	Notified Area, Civil Lines.	Total.
Total	**400**	**19**	**5**	**424**
January	8	1	..	9
February	8	..	..	8
March	12	3	..	15
April	23	1	..	24
May	55	1	2	58
June	55	1	..	56
July	45	6	..	51
August	57	1	2	60
September	56	1	..	57
October	55	2	..	57
November	20	1	..	21
December	8	1	1	10

U. P.—Although 8,143 deaths were ascribed to enteric fever, the actual mortality based on verification work is believed to be over 19,000 deaths. Recorded deaths numbered 2,041 in towns and 6,102 in rural areas, yielding rates of 0·6 p.m. and 0·1 p.m., respectively. Among rural districts Nainital and Jalaun reported the highest mortality of 1·3 p.m. each.

B. & O.—Hospitals and dispensaries in the districts of Monghyr and Bhagalpur returned the highest numbers treated for this disease, *i.e.*, 1,273 and 1,063 cases. Other high figures were Saran 793 cases, Gaya 740, Patna 713 and Santal Parganas 670.

Bengal.—Although the urban areas reported a slight increase, the provincial mortality was less this year, deaths totalling 9,754, rural 7,995 and urban 1,759, yielding rates of 0·2. p. m., 0·2 p. m. and 0·5 p.m., respectively.

C. P.—The 8,681 registered deaths give a rate of 0·6 p. m., the worst affected districts being Yeotmal with 1,849 deaths and Nagpur with 1,192. High figures for other districts were 745 deaths in Wardha, 716 in Amraoti and 711 in Bhandara. The D. P. H. remarks :

" I have reason to believe that the disease is far more prevalent than reported. The generally unsatisfactory condition of water supplies, conservancy and drainage are all important factors in this connection. It is suspected that many deaths from enteric fever are attributed to malaria, influenza and relapsing fever."

Bombay.—Of the 6,684 deaths ascribed to enteric fever 5,469 were in rural and 1,215 in urban areas, the death rates being 0·3 p.m. and 0·3. p.m. Bombay city recorded 235 deaths, Sholapur 111, Poona 99 and Surat 60. High mortality occurred in the rural districts of Kolaba 907, West Khandesh 885, Thana 650, Dharwar 530, Nasik 397, Kanara 338, Ahmednagar 330, Belgaum 324 and East Khandesh 300.

Madras.—There were 1,393 deaths in municipal towns.

Assam.—Of the cases treated for this disease in medical institutions 286 or more than 50 per cent. were in the districts of Sylhet and Goalpara. The P. H. Department recorded 42 deaths from typhoid fever in 10 towns. Contacts were protected with T. A. B. inoculation, and other preventive measures were also carried out.

Burma.—The D. P. H. reported—

" The total number of deaths recorded is 267, which, it is considered, does not represent the true incidence of this type of fever. Bacteriological diagnosis is only resorted to by private practitioners in a small proportion of the cases of fever, and it is believed that a number of enteric infections are missed. The disease is notifiable in towns. Of the cases reported from Mandalay, 76 per cent. had a fatal ending, which high figure suggests that many non-fatal cases probably went unreported. High rates of mortality from enteric fever have been reported in Magwe 0·97, Ngathainggyaung 0·93, Mawlaik 0·88, Maymyo 0·84, Kyaikto 0·76, Sagaing 0·64, Myitkyina 0·68, Moulmein 0·56 and Mandalay 0·50."

Respiratory Diseases.

23. Table II (xxxv) gives the recorded deaths and rates *per mille* for British India and the provinces.

TABLE II (XXXV).

	Deaths.		Rate *per mille*.		
	1934.	1933.	1934.	1933.	1929-33.
British India	**483,018**	**443,305**	**1·8**	**1·6**	**1·6**
N.-W. F. P.	3,151	2,754	1	1	1
Punjab	55,570	55,337	2	2	2
Delhi	4,480	4,463	7	7	7
U.P.	46,567	34,898	1	1	1
B. and O.	7,348	6,295	..	..	..
Bengal	85,113	82,173	2	1	1
C. P.	45,181	32,134	3	2	2
Bombay	106,568	100,200	5	5	5
Madras	107,742	105,828	2	2	2
Coorg	152	179	1	1	2
Assam	6,440	5,444	1	..	1
Burma	12,991	12,043	1	1	1
Ajmer-Merwara	1,715	1,557	3	3	1

Table II (xxxvi) gives the recorded deaths and rates *per mille* by sex and in rural and urban areas.

TABLE II (XXXVI).

	Male.		Female.		Rural.		Urban.	
	Deaths.	Rate p.m.	Deaths.	Rate p.m.	Deaths.	Rate p.m.	Deaths.	Rate p.m.
British India	**272,411**	**1·9**	**210,607**	**1·6**	**332,581**	**1·3**	**150,427**	**5·5**
N.-W. F. P.	1,842	1·4	1,309	1·1	1,732	0 8	1,419	4·4
Punjab	31,362	2·3	24,208	2·2	41,808	2·0	13,762	4·2
Delhi	2,459	6·4	2,021	7·2	1,406	6·8	3,074	6·7
U. P.	24,546	0·9	22,021	0·9	12,367	0·3	34,200	8·7
B. and O.	4,365	0·2	2,983	0·2	6,404	0·2	944	0·6
Bengal	53,272	2·1	31,841	1·3	67,143	1·4	17,970	5·1
C. P.	26,579	3·3	18,602	2·3	38,559	2·7	6,622	3·8
Bombay	58,272	4·9	48,296	4·5	71,230	3·9	35,338	8·2
Madras	57,440	2·5	50,302	2·1	81,537	2·0	26,205	4·1
Coorg	105	1·2	47	0·6	88	0·6	64	6·7
Assam	3,822	0·9	2,618	0·7	5,950	0·7	490	2·4
Burma	7,466	1·2	5,525	0·9	4,352	0·4	8,639	6·1
Ajmer-Merwara	881	2·3	834	3·7	5	...	1,710	9·5

N. W. F. P.—The urban rate continued to be nearly five times the rural rate. Urban rates were 9 p.m. in Tank, 6 p. m. in Peshawar, 5 p. m. in D. I. Khan and 0·3 p.m. in Charsadda.

Punjab.—The provincial death rate was exceeded in 11 districts, the excess being most marked in Simla, Amritsar, Kangra, Sialkot and Ludhiana. The urban death rate, as usual, was higher than the rural.

Delhi.—This province shows very little difference in the rural and urban death rates. Delhi city and the notified area reported the highest mortality *viz.*, 7·6 p. m. and 6·5 p. m., respectively. Maximum mortality occurred in December and January.

U. P.—Attention is again drawn to the continued high mortality in the districts of Hamirpur, Lucknow, Agra and Cawnpore and low mortality in the districts of Mainpuri, Basti and Kheri. This year, Dehra Dun district also reported a high death rate. The urban rate was 33 times the rural. Maximum mortality occurred in March and minimum in July.

B. & O.—The urban death rate continued to be higher than the rural, rates being 0·6 p. m. and 0·2 p. m., respectively. Compared with most other provinces, these rates are very low. The Orissa division reported the highest mortality, *viz.*, 4,326 deaths or nearly 60 per cent. of the total.

Bengal.—Compared with 1933, the recorded mortality from respiratory diseases, which was 7·2 per cent. of the total mortality, increased by over 6 per cent. and the death rate exceeded the quinquennial mean by 31 per cent. This increase was attributed to the greater prevalence of influenza which alone was responsible for over 48 per cent. of the total deaths classified as respiratory diseases. The highest mortality occurred during December and January to April and the lowest in June. Compared with the decennial mean, increased mortality was registered in every month. Eleven districts returned death rates in excess of the provincial average, Calcutta reporting the highest (9 p. m.), followed by Jalpaiguri (5 p. m.), Howrah (4), Hooghly (4) and Darjeeling (4). The death rate in towns increased by 2 per cent. that in rural areas by 21 per cent; the urban rate was about thrice the rural.

C. P.—Mortality was highest in March and lowest in July. Jubbulpore district again returned the highest death rate, 12·1 p. m. as against 8·5 p. m. in 1933. Other high district rates were Saugor 7 p.m., Betul and Nimar 6 p.m. each, Buldana and Akola 4 p.m. each. The urban death rate, 3·9 p. m., exceeded rural death rate, 2.8 p.m.

Bombay.—In this Presidency also, increased mortality was reported. The Table below shows the figures of the last 4 years and the means of the previous three decennia.

(TABLE II xxxvii).

	Deaths.	Rate p.m.
1901-10 (mean)	57,723	3
1911-20 („)	79,625	4
1921-30 („)	92,250	5
1931	97,969	4
1932	93,524	4
1933	100,200	5
1934	106,568	5

The districts of Kaira, Surat, Ahmedabad, Kolaba, Ahmednagar, Thana, Broach, Poona, Bombay Suburban, Bijapur and Karachi reported high death rates varying between 10 p. m. and 5 p. m. The rate of mortality in towns was double that in rural areas.

Madras.—The steady increase in the mortality curve in this Presidency, which has been a feature during the last decade, was maintained. Mortality was high in the cold months of January, November, and December. As usual, the Nilgiris district registered the highest death rate of 5 p. m. Other high death rates were East Godavari (hills) 4 p. m., Madura 4 p. m., Bellary 4, Kistna 3 and East Godavari (plains) 3. The urban death rate was 6 p. m. and the rural 2 p. m.

Assam.—Mortality was highest in March and lowest in May. Lakhimpur district continued to record the highest death rate and Goalpara the lowest.

Burma.—The months of April to June showed the lowest mortality. In other months, the deaths were scattered fairly evenly. The death rate in urban areas was 15 times that in rural areas.

Pneumonia.

24. Table II (xxxviii) gives the numbers of deaths and the rates p. m. in a few provinces which record them.

TABLE II (xxxviii).

	Deaths.	Rates p.m.
N. W. F. P.	190†	0·7
Punjab	4,301*	..
Delhi	1,463	2·3
U. P.	15,039	0·3
Bengal	41,006	0·8
C. P.	24,197	1·0
Madras	4,687†	..
Assam	263*	..
Burma	3,764‡	2·7

* In 13 municipal towns.
† In municipal towns.
‡ In urban areas.

Table II (xxxix) gives death rates *per mille* for some of the larger towns :—

TABLE II (xxxix).

	1934.	1933.		1934.	1933.
N. W. F. P.—			Bombay Presidency—		
Peshawar	1	Not	Bombay	7	6
		available.	Hyderabad	6	5
Punjab—			Poona	7	5
Lahore	3	„	Ahmednagar	4	3
Ambala	4	„	Karachi	5	7
Rawalpindi	4	„	Nasik	3	2
			Ahmedabad	3	2
Simla	11	„			
Jullundur	3	„	Coorg—		
Multan	7	„	Mercara	..	12
Delhi Province—			Assam—		
Delhi city..	2	2	Shillong	3	4
			Dibrugarh	2	1
United Provinces—			Nowgong	4	3
Lucknow	12	9	Gauhati	2	2
Agra	11	11			
Cawnpore	9	12	Burma—		
Aligarh	5	..	Rangoon	4	4
			Mandalay	3	3
Bengal Presidency—			Meiktila	2	6
Howrah	3	3			
Calcutta	2	2			

Tuberculosis.

(a) *General.*

25. The question of the period over which tuberculosis has been endemic in India is not easy to determine. "Charaka" and "Sushruta", writing about 500 B. C., gave descriptions of this disease. It seems unlikely however, that tuberculosis could have been widespread at this early period, when it was more probably confined to a few of the larger urban centres of population. The wide distribution of tuberculosis of recent years must in a considerable measure be due to increase of urbanization and the environmental factors associated therewith, producing overcrowding and other conditions which predispose to this disease. The present position would appear to be that, whereas our towns are heavily infected, and their residents tuberculised to some extent, the rural population for the most part have not yet experienced the full force of the disease. If this assumption be correct, we must anticipate a much greater spread of tuberculosis among the rural population which will be facilitated by the rapidly increasing means of communications from town to village and from village to village.

Our data in regard to the incidence of tuberculosis are lamentably deficient. Only in some urban centres has it been practicable to make the disease notifiable. There is no use in introducing compulsory notification unless it can be enforced in practice, and there are many obstacles in the way, including paucity of qualified medical practitioners, the *purdah* system, ingrained prejudice against hospitals, and the tendency to conceal disease until the development of symptoms makes concealment no longer possible. Generally speaking, the population of India are highly susceptible to tuberculosis and among most of them the disease takes a virulent form and runs a rapid course. Public health officers may well-nigh despair of tackling this vast problem satisfactorily within the life-time of the present generation. Environmental sanitation in India is definitely backward, and in particular the housing problem is exceedingly difficult. Many urban areas have bad or indifferent building byelaws and these, such as they are, tend to be inadequately enforced. We are witnessing to-day in many towns the creation, year by year, of housing conditions favourable to the rapid spread of tuberculosis. Until this problem is dealt with, we shall continue to create new slums within our towns and to add to the magnitude of the tuberculosis problem. First and foremost, the problem resolves itself into one of improving housing in urban areas with all that this connotes in the way of space, sunlight and fresh air. To tackle the problem from any other aspect than this is to begin at the wrong end. It is beyond the financial resources of the country to build hospitals and sanatoria to house our countless cases of tuberculosis, unless we can reduce markedly the number of fresh cases infected each year, by improvement of environmental conditions. Energetic propaganda is therefore required, particularly among the members of Municipal Committees and the like, to impress upon them the importance of improved housing in their towns and the provision of parks and playgrounds.

The importance of good nutrition in the prevention of tuberculosis cannot be overstressed. This however is a problem by itself. Here it may only be noted that there is evidence of increased attention being paid to this vitally important subject.

Last year the Director-General, Indian Medical Service (Sir John Megaw) on the basis of data collected by him from medical officers and others

throughout India, reported that there are probably two million cases of tuberculosis in India. His conclusions are given below.

"Tuberculosis is evidently very widespread throughout the villages of India but is specially serious in Bengal, Madras, the Punjab and Bihar and Orissa. Pulmonary tuberculosis seems to be much more common than extra-pulmonary except in the United Provinces and Bombay. The low incidence in the Central Provinces is remarkable and is perhaps associated with the sparse distribution of the population and with defective means of communication".

"Tuberculosis is well known to be exceedingly prevalent in the cities and large towns but little is known as to its incidence in rural areas. The evidence of the dispensary doctors goes to show that the disease is very widely disseminated throughout India. From other sources of information it seems likely that the disease is increasing steadily and rather rapidly. The estimate of just over two million cases of tuberculosis in India as a whole is probably much too low : every large town is known to be very heavily infected, and therefore an estimate which is based solely on the incidence of the disease in the agricultural villages must be unduly favourable".

"Tuberculosis is a disease which has very special importance in India for the reasons— (1) it is likely that many villagers have never come in contact with infection and therefore are "virgin soil" on which the disease is likely to thrive, (2) the infection is being steadily spread from the large towns to the villages, (3) the disease constitutes a reliable index of the standards of life which prevail in countries in which it has become established for long periods of time ; it spreads rapidly among ill-nourished and badly housed populations and correspondingly diminishes when the people are well fed, well housed and cleanly in their habits ."

Statistics of deaths from tuberculosis are, as has already been stated very scanty. Table II (xl) shows the information in so far as it is available from provinces.

TABLE II (xl).

	Deaths from tubercle of lungs.			Percentage of total deaths.		
	Rural.	Urban.	Total.	Rural.	Urban.	Total.
Total . .	**30,619**	**20,451**	**51,070**	..	..	..
N. W. F. P. . . .	..	70	70	..	0·3	..
Delhi	73	403	476	1·0	3·4	2·5
U. P.	569	5,402	5,971	0·1	3·7	0·5
B. & O.	..	..	..	..	..	..
Bengal	10,928	3,917	14,845	0·9	5·4	1·3
C. P.	3,205	905	4,110	0·6	1·5	0·7
Bombay	15,843	7,406	23,249	3·6	6·7	4·2
Madras	..	..	..	..	..	..
Coorg	1	2	3	0·1	0·0	0·0
Assam	..	125	125	..	..	..
Burma (Urban) . . .	..	2,221	2,221	..	5·2	..

Only Bombay, Bengal, the Central Provinces, the United Provinces and Delhi record any figures from rural areas, and these statistics cannot be relied on.

In Delhi city statistics of mortality from tuberculosis have been carefully collected for a number of years and are given below.

	Total deaths.	Deaths from tuberculosis.	Per cent. of total deaths.
1927	8,096	624	7·6
1928	8,535	759	8·6
1929	11,749	889	7·5
1930	9,400	1,241	13·2
1931	9,143	1,194	13·1
1932	9,589	898	9·3
1933	11,489	850	7·3
1934	10,528	884	8·3
1935 (9 months)	9,750	735	7·5

Imperfect though they must be, the figures show the heavy toll which this disease exacts in an overcrowded Indian town.

In Bombay city, where 74 per cent. of the population lived in single rooms at the time of the 1931 census, the recorded figures are as follows.

	Death rate *per mille*.		
	Pulmonary.	Other forms.	Total.
1924-33	1·2	0·1	1·3
1929-33	1·1	0·1	1·2
1933	1·2	0·2	1·4
1934	1·4	0·2	1·6

From Rangoon also figures are available and they are given below.

	Male.		Female.	
	Deaths.	Rate p.m.	Deaths.	Rate p.m.
1930	519	2·2	242	2·3
1931	538	2·0	239	1·9
1932	569	2·1	265	2·1
1933	561	2·1	256	2·0
1934	572	2·1	259	2·0

Madras city records a death-rate of 1·4 *per mille* for tuberculosis of the lungs, while in part of Lahore, where a tuberculosis survey has recently been carried out, 311 cases were detected in a population of 8,269 which works out at 3·75 per cent.

Although mortality figures, differentiated according to sex, are not available, the fact that females are more severely infected than males is evident from the high female death rates from respiratory diseases given in Table II (xxxvi). A table at page 87 of last year's report indicates that, between the ages of 15 and 40, female mortality rates are much higher than the corresponding rates for males. Unfortunately no other data showing the distribution of the disease by age-groups are available.

Table II (xli) gives the number of tuberculosis cases treated in hospitals and dispensaries. The ratio of tuberculosis cases to total cases treated is probably the best indication we have of relative incidence of tuberculosis.

TABLE II (xli).

	1934.				1933.			
	Pulmonary.	Other types.	Total.	% of total.	Pulmonary.	Other types.	Total.	% of total.
Total .	**168,985**	**88,588**	**257,583**	**0·3**	**158,291**	**86,978**	**245,269**	**0·3**
N.-W. F. P.	6,429	4,974	11,403	0·6	5,760	4,100	9,860	0·5
Punjab .	16,622	15,455	32,077	0·2	16,253	13,673	29,926	0·2
Delhi .	3,647	4,136	7,788	0·9	4,210	4,441	8,651	0·8
U. P. .	22,205	17,082	39,287	0·5	20,149	18,281	38,430	0·5
B. & O. .	18,383	6,774	25,157	0·4	18,721	7,029	25,750	0·4
Bengal .	27,661	8,537	36,198	0·5	24,730	7,077	31,807	0·3
C. P. .	3,482	2,472	5,954	0·2	3,481	2,600	6,081	0·2
Bombay .	16,059	7,402	23,461	0·6	15,516	8,524	24,040	0·6
Madras .	46,454	20,024	66,478	0·4	41,171	18,728	59,899	0·4
Coorg .	81	78	159	0·1	120	57	177	0·1
Assam .	1,573	230	1,803	0·1	1,447	289	1,736	0·1
Burma .	6,389	1,424	7,813	0·2	6,291	1,628	7,919	0·3
Baluchistan .	Not available.		Not available.		442	551	993	0·1

Anti-tuberculosis Organizations.—The King George's Thanksgiving (anti-tuberculosis) Fund is the only all-India organization dealing with tuberculosis. This Fund has a Central Committee and branches in the provinces, and concerns itself both with prevention and treatment, and, in addition to carrying out propaganda, provides training for medical men in tuberculosis work. Its activities are invaluable, but unfortunately its funds are too restricted to enable it to carry out work on a large scale. A list of local voluntary organizations existing in the provinces and elsewhere is given below.

1. Indian Red Cross Society, Ajmer-Merwara District Branch, Ajmer.
2. Anti-Tuberculosis Sub-Committee, Assam Provincial Branch, Director of Public Health's Office, Shillong.
3. Anti-Tuberculosis Sub-Committee, Civil and Military Station Local Branch, Bangalore.
4. Anti-Tuberculosis Sub-Committee, Indian Red Cross Society, Baroda State Branch, Baroda.
5. Tuberculosis Association of Bengal, Calcutta.
6. Anti-Tuberculosis Sub-Committee, Bihar Provincial Branch, Director of Public Health's Office, Patna.
7. Propaganda and Health Sub-Committee, Indian Red Cross Society, Bombay.
8. Anti-Tuberculosis Committee, Indian Red Cross Society, Nagpur City.
9. Anti-Tuberculosis Sub-Committee, Delhi Provincial Branch, Silver Jubilee Tuberculosis Hospital, Delhi.
10. Anti-Tuberculosis Sub-Committee, Hyderabad British Administered Areas, Hyderabad, Deccan.
11. Anti-Tuberculosis Sub-Committee, Indian Red Cross Society, Jodhpur.
12. Anti-Tuberculosis Sub-Committee, Madras Presidency Branch, Director of Public Health's Office, Madras.

13. Indian Red Cross Society, Mysore State Branch, Bangalore.
14. Anti-Tuberculosis Sub-Committee, Punjab Provincial Branch, 2 Birdwood Road, Lahore.
15. Anti-Tuberculosis Committee, Jullundur City, Punjab.
16. Anti-Tuberculosis Committee, Women's Christian Medical College, Ludhiana City, Punjab.
17. Health and Sanitation Sub-Committee, Municipality, Simla.
18. Indian Red Cross Society, Sind Provincial Branch, Karachi.
19. Anti-Tuberculosis League, 8, Shahmina Road, Lucknow, U. P.
20. Anti-Tuberculosis League, Bharti Bhawan Street, Allahabad City, U. P.
21. Anti-Tuberculosis Sub-Committee of the Agra Citizen ' Association, Agra, U. P.
22. Anti-Tuberculosis League, Cawnpore, U. P.
23. Anti-Tuberculosis League, Bareilly, U. P.
24. Anti-Tuberculosis League, Benares, U. P.

An attempt has also been made to collect as complete a list as possible of institutions for the treatment of tuberculosis in India, and this information is also supplied beneath.

Sanatoria.

Bengal.—Lowis Jubilee Sanatorium, Darjeeling. Tuberculosis Hospital and Sanatorium, Jadabpur.

Bihar.—Itki State Sanatorium, Itki.

Bombay—

In Bomby City—

Adams Wyllie Hospital.

St. Joseph's Foundling House (for R. C. patients only), Agrepada Road.

Bhoiwada Hill Sanatorium, Parel (32 beds).

Turner Sanatorium, Princes Street (32 beds).

In the Mofussil—

Bahadurjee Sanatorium, Deolali (28 beds).

Hindu Sanatorium, Karla, Poona (40 beds).

Bel-Air Sanatorium, Panchgani (90 beds).

American Presbyterian Mission Sanatorium, Vengurlu (25 beds).

Wanless Tuberculosis Sanatorium, Miraj, S. M. C. (50 beds).

Maharashtra Tuberculosis Sanatorium, Panchwati, Nasik.

Central India.—Sanatorium for the Treatment of Tuberculosis, Rao Indore Durbar, Indore.

Central Provinces.—Nirmalendu Tuberculosis Sanatorium, Pendra Road, Bilaspur.

Madras.—Union Mission Tuberculosis Sanatorium, Arogyavaram, Madanpalle, Chittoor.

Edward VII Tuberculosis Institute, Egmore, Madras.

Visranthipuram Tuberculosis Sanatorium, Rajahmundry, E. Godavari District (South India).

Mysore.—Princess Krishnajammani Sanatorium, Mysore.

Punjab.—Patiala State Sanatorium, Dharampur, Simla Hills.

King Edward Sanatorium, Dharampur (Simla Hills).

Lady Irwin Sanatorium, Sanawar (Simla Hills).

Jubilee (Mohd. Hussain) Sanatorium, Samli (Murree Hills).

Gulabdevi Tuberculosis Sanatorium, Ferozepore Road, Lahore.

Hindu Tuberculosis Sanatorium, Multan.

Rajputana.—Mary Wilson Tuberculosis Sanatorium, Tilaunia.

United Provinces.—King Edward VII Sanatorium, Bhowali, District Naini Tal.

Sanatorium, Almora.

Tuberculosis Sanatorium, Keralabad, Allahabad.

The relation of tuberculosis to overcrowding is well established, but few figures are available for India. This makes the data compiled in a recent Lahore investigation of interest. These are shown in Table II (xlii) and clearly indicate the close connection between overcrowding and high incidence of tuberculosis.

TABLE II (xlii).

Families occupying.	All families.	Infected with T. B.	Percentage incidence of tuberculosis.
1 living room	1,018=51%	121=59%	12
2 living rooms	606=30%	63=31%	10
3 living rooms	191= 9%	14= 7%	7
4 living rooms	97= 5%	4= 2%	4
More than 4	97= 4%	2= 1%	2

(*b*) *Provincial.*

N. W. F. P.—Judging from hospital attendances, the districts of Peshawar with 2,752 cases and 45 deaths, Hazara with 1,061 cases and 4 deaths and Bannu with 1,048 cases and 13 deaths are highly infected.

Punjab.—In the 13 municipal towns employing M. O. Hs., a total of 1,547 deaths was ascribed to pulmonary tuberculosis; these included 496 in Lahore (1·3 p. m.), 272 in Amritsar (1·0), 196 in Ludhiana (3·0), 179 in Multan (1·7) and in 9 other towns the deaths numbered from 8 each in Lyallpur (0·2) and Sargodha (3·0) to 89 in Jullundur (1·2) and 98 in Sialkot (1·2).

The enquiry into the incidence of tuberculosis and the environmental and economic conditions associated therewith started in 1932 in a suburb of Lahore was concluded. Tuberculosis cases found in this survey totalled 311, which, based on the 8,269 persons examined, show a morbidity rate of 3·8 per cent. The age distribution of these cases was as given in Table II (xliii).

TABLE II (xliii).

Age groups.	Cases.			Per cent. of total examined.		
	M.	F.	Total.	M.	F.	Total.
0-5 years . . .	10	8	18	1·4	1·0	1·2
5-10 years . . .	23	15	38	3·0	2·6	2·8
10-15 years . . .	18	20	38	4·7	6·2	5·4
Total children . .	51	43	94	2·7	2·5	2·6
15-25 years . . .	23	65	88	2·6	6·6	4·7
25-35 years . . .	29	28	57	4·3	5·3	4·8
35-45 years . . .	11	23	34	3·1	6·5	4·8
45-60 years . . .	11	14	25	3·7	3·9	3·8
60 years and over .	6	7	13	4·0	6·7	5·1
Total adults .	80	137	217	3·4/5	5·9	4·6
Grand Total .	131	180	311	3·1	4·5	3·8

Table II (xliv) gives these cases in relation to available open spaces in houses.

TABLE II (xliv).

Open space available.	All families.	Tuberculous families.	Incidence of tuberculosis based on families in the group.
No open space	558	73	13%
Less than 100 sq. ft. . . .	460	56	12%
100-200 sq. ft.	342	34	10%
200-500 sq. ft.	370	29	8%
Above 500 sq. ft. . . .	269	12	4%

In the surveyed area, 31 per cent. of " un-detached " houses showed the disease, 18 per cent. of " semi-detached " and 4 per cent. of bungalows.

For further details the original report should be consulted.

Delhi Province.—Table II (xlv) gives the registered deaths by sexes and communities.

TABLE II (xlv).

	Deaths.			Rate *per mille*.		
	M.	F.	Total.	M.	F.	Total.
All classes . . .	345	632	977	0·9	2·4	1·5
Hindus . . .	202	285	587	0·9	1·7	1·4
Muhammedans . .	140	243	383	1·1	3·0	1·9
Christians . . .	3	4	7	0·3	0·5	0·4

The high incidence of pulmonary tuberculosis has been ascribed to the appalling conditions of overcrowding in Delhi city.

Since the close of the year, however, the Delhi municipality have sanctioned the opening of a tuberculosis clinic and dispensary. An officer has also been deputed to make a special study of the extent of congestion in Delhi city and to suggest ways and means to relieve it.

U. P.—Of the deaths classified under the respiratory diseases group, 5,971 or 13 per cent. were attributed to phthisis. Deaths in towns totalled 5,402; those in rural tracts 569.

Of the 5 tuberculosis clinics which have been at work in this province for some years past, that at Benares has been transferred to the sanatorium at Sarnath, a suburb of Benares; those at Agra, Allahabad and Cawnpore proved failures and were closed and that of Lucknow has been merged in the King George's Hospital. It was proposed to open a central clinic on modern lines at Allahabad entirely with Government funds. Cases treated at these clinics numbered 2,272 at Agra, 2,490 at Lucknow, 436 at Allahabad, 94 at Sarnath and 82 at Cawnpore.

The Anti-tuberculosis League, Lucknow, have built a tuberculosis hospital with 40 beds in the general and 4 in private wards; the local Government propose to meet the recurring expenses, when funds permit.

B. & O.—This disease together with influenza and pneumonia is the main cause of increased mortality from respiratory diseases. An anti-tuberculosis sub-committee has been conducting for some years a campaign against the spread of this disease by means of intensive propaganda and medical inspection of school children. Financial stringency has not permitted further expansion of the activities of this committee.

The I. G. C. H. notes the economic nature of the tuberculosis problem and states that efforts will shortly be made to open outdoor tuberculosis clinics where cases can be examined and treated, given advice and followed to their homes by health visitors.

Bengal.—Deaths in rural areas decreased by 202 or over 4 per cent., but in urban areas increased by 245 or 7 per cent. Seven per cent. of the total urban mortality from phthisis (2·3 p.m.) was recorded from Calcutta. Other high death rates were registered in the districts of Darjeeling 1·5 p.m., Howrah 0·7 p. m., Jalpaiguri 0·6, and Hooghly 0·5.

C. P.—Deaths from pulmonary tuberculosis (4,110) increased by 77 per cent. as compared with 1933. The death rate was 0·3 p.m. The district of Nagpur again reported the largest number of deaths, 1,117 or 27 per cent. of the total and 96 per cent. more than in 1933. Figures for other districts were Wardha 638 deaths, Amraoti 472, Bhandara 458 and Saugor 410. As usual, the prevalence of the disease was greater in urban than in rural areas, the death rates being 0·5 p.m. and 0·3 p. m. respectively. Of the 3,053 cases treated in hospitals and dispensaries, 1,671 attended medical institutions in Nagpur district, 442 in Nimar, 319 in Saugor, 300 in Amraoti, 290 in Akola and 106 in Chhindwara districts. The Nirmalendu tuberculosis sanatorium treated 19 old and 50 new cases; of these 5 died and 20 were cured and in 13 the disease was arrested. Patients treated in the tuberculosis ward in the Main Hospital, Nagpur, totalled 945. Proposals to provide clinics and sanatoria were under consideration of the local Government.

Deaths due to other forms of tuberculosis numbered 1,512 (0·10 p.m.) as against 890 (0·06 p.m.) in 1933. Of the total, 225 deaths were recorded in Nagpur, 188 in Saugor, 185 in Buldana, 146 in Akola, 126 in Bhandara and 101 in Jubbulpore.

Bombay.—Deaths ascribed to phthisis increased by 3 per cent. Among rural areas, incidence continued high in the Konkan for reasons stated in previous reports, the district of Kolaba recording a rate of 3 p.m., Kaira 2 p.m., Ratnagiri 2 p. m., Thana, Bombay Suburban and Ahmedabad 1 each.

In addition to the 4 sanatoria in Bombay City and 6 in the *muffassal* there are special clinics or dispensaries at Bombay, Ahmedabad, Hyderabad and Karachi. In addition to the Turner sanatorium, the Bombay municipality continued to maintain two outdoor dispensaries for tuberculous patients, one at the Sanitary Institute, Princess Street and the other at Foras Road. Pulmonary cases treated at these dispensaries totalled 1,174 and other types 201. Of the 176 cases treated in the Turner sanatorium, 65 in the first stage (congestion), 101 in the 2nd stage (consolidation) and 10 in the 3rd stage (cavitation), 135 or 77 per cent. showed improvement. The municipal tuberculosis dispensary in Karachi city attended 54,809 including 881 new cases. The 2 lady health visitors attached to this dispensary detected 668 suspicious cases, of which 404 were found to be suffering from tuberculosis. In Hyderabad town (Sind) 1,625 cases were admitted in the K. T. tuberculosis dispensary. An anti-tuberculosis centre was opened in Shikarpur town.

Madras.—Altogether 704 in-patients were treated in the tuberculosis hospital, Madras city and 9,226 outpatients in the tuberculosis institute, Madras. The Surgeon General remarks :—

"The treatment of tuberculosis is still in its infancy in the Presidency as regards the provision of beds in special hospitals or sanatorium, dispensaries and clinics. A sanatorium on the lines of that at Madanapalle is needed in various groups of districts within easy distance of the largest towns; one is badly needed outside Madras. A sanatorium is proposed at Perundurai some 48 miles from Coimbatore and local efforts are well advanced in this direction."

Detailed returns of vital statistics submitted by health officers of 15 municipalities give a total of 2,247 deaths or 2 p.m. from tuberculosis of lungs; one among those under one year of age, 9 among those aged between 1-5 years; 10 between 5-10 years, 27 between 10-15 years, 178 between 15-20 years, 601 between 20-30 years; 537 between 30-40 years; 460 between 40-50 years; 283 between 50-60 years; and 141 among those aged 60 years and above.

Assam.—Lung tuberculosis is very prevalent in Sylhet district. The local Government in their resolution on the Report on the working of Hospitals and Dispensaries in Assam for the triennium ending 1934 say :—

"Consciousness of the presence of tuberculosis in urban communities has awakened considerable public anxiety about this disease in Assam as elsewhere in India. There were 4,433 cases of tuberculosis of the lungs treated during the period under review against 4,010 in the previous triennium. Special lectures, demonstrations and propaganda work on the subject are being undertaken under the supervision of a special committee of the Red Cross, with the help of the King George Thanksgiving Fund and money provided by the Public Health Department. The question of a tuberculosis sanatorium in the province for early and curable cases and of means to make knowledge as to the mode of dissemination of this disease more widely spread have been engaging the attention of Government. Lack of funds stands in the way of an attempt to solve the first problem. The solution of the second is rendered difficult by the widespread ignorance of the ordinary laws of health even amongst the residents of urban areas. It is hoped that the propaganda work undertaken will bear some fruit and this is by far the best and the most hopeful method of combating the menace."

Burma.—Thamaing town, a suburb of Rangoon, which is becoming an increasing industrial town, continued to report the highest death rate from pulmonary tuberculosis. This disease is said to be common in the Northern Shan States chiefly among the alien population of Ooriyas, Chinese, Gharwalis and Gurkhas ; in these states although climatic conditions are not favourable for consumption, the prevalence of malaria is reported to be an important predisposing cause.

Table II (xlvi) gives figures for a number of towns where a high death rate from tuberculosis of the lungs was recorded.

TABLE II (xlvi).

	Death rate p.m.			Death rate p.m.	
	1934.	1933.		1934.	1933.
Delhi Province—			Bombay Presidency—		
Delhi City	1	1	Bombay	2	1
			Ahmedabad	4	3
United Provinces—			Surat	3	3
Cawnpore	4	3	Ahmednagar	2	2
Lucknow	2	3			
Agra	3	2	Poona	3	3
			Nasik	3	3
Farrukhabad	1	1	Karachi	2	2
Benares	1	2	Hyderabad	2	2
Bareilly	3	2			
Allahabad	2	2	Burma—		
			Rangoon	2	2
Bengal—			Myaungmya	2	4
Calcutta	2	2	Mandalay	2	2
Howrah	1	1			
Dacca	1	1	Meiktila	1	2
			Yenangyaung	2	3
			Pegu	2	2

Beri-beri.

26. Table II (xlvii) gives the numbers of cases treated in hospitals and dispensaries in British India and in the various provinces during 1933 and 1934. These figures do not indicate the true incidence of the disease in the general population, but even so they demonstrate the higher incidence of the disease in the rice consuming provinces.

TABLE II (xlvii).

	1933.		1934.	
	Cases.	Deaths.	Cases.	Deaths.
Total	**27,583**	**178**	**40,085**	**189**
N. W. F. P.	..	..	..	..
Punjab	25	..	36	..
Delhi	41	..	38	..
U. P.	122	..	276	2
B. & O.	280	1	1,834	4
Bengal	4,078	12	13,236	22
C. P.	5	..	13	..
Bombay	14	..	12	..
Madras	21,335	57	23,071	47
Assam	125	1	88	1
Burma	1,557	107	1,481	113
Baluchistan	1	..	..	..

B. & O.—Only in Manbhum district was there a severe outbreak which reported 1,393 cases or 76 per cent. of the total.

Bengal.—Judging from hospital attendances the incidence was high in 1934, particularly in Calcutta city with 6,054 cases and in the 24-Parganas district in the Presidency division with 1,824 cases. In Burdwan and Dacca divisions cases numbered 1,993 and 1,401, respectively.

Madras.—Beri-beri is said to be endemic in Vizagapatam and in the neighbouring districts. Over 91 per cent. of the total cases treated in hospitals and dispensaries were in the districts of Vizagapatam, East and West Godavaris, Kistna, Guntur and Nellore.

Burma.—Deaths totalled 176 in towns with a rate of 0·1 p.m. The highest rates were registered in Ngathainggyaung 1·3 p.m., Mergui 0·9, Allanmyo 0·6, Danubyu 0·6 and Yandoon 0·6. In Mergui and Moulmein the incidence was chiefly among Telegu coolies. In Syriam also most of the cases were among Indian coolies. In the rural areas, the prevalence of the disease among the *Mahouts* of timber camps in the Upper Chindwin and Toungoo districts appears to be associated with cold and damp and—perhaps in consequence—with deteriorated rice.

Ankylostomiasis.

27. Table II (xlviii) gives the numbers of cases treated in British India and in the different provinces. Much the highest number was as usual recorded in the Madras Presidency.

TABLE II (xlviii).

	1932.		1933.		1934.	
	Cases.	Rate per 10,000 of total.	Cases.	Rate per 10,000 of total.	Cases.	Rate per 10,000 of total.
Total	**152,972**	**20·8**	**164,480**	**22·0**	**210,744**	**28·0**
N. W. F. P.	426	2	661	3	947	4
Punjab	1,976	1	2,296	1	3,424	2
Delhi	103	1	59	..	43	..
U. P.	1,200	1	1,414	2	3,354	4
B. & O.	19,439	27	18,000	25	21,966	31
Bengal	4,351	5	4,544	4	6,062	6
C. P.	97	..	309	1	1,794	5
Bombay	1,127	2	388	1	411	1
Madras	122,405	76	131,258	79	166,438	90
Coorg	..	..	3,463	120	2,965	96
Assam	901	4	930	4	1,848	8
Burma	945	3	1,152	3	1,492	4
Baluchistan	2	..	6	..	..	..

Punjab.—Anti-hookworm measures were continued in Shakargarh *tehsil* up to July, 1934, when the local Government sanctioned a scheme of mass treatment campaign in that *tehsil* and a survey of the rest of the province. This was done with the aid of one laboratory, two investigation and four treatment units. The treatment units dealt with 489 villages and treated 43,942 persons; the investigating units conducted a detailed survey in the tehsils of Shakargarh and Batala in Gurdaspur district and in the districts

of Hoshiarpur, Sialkot and Ambala ; the laboratory unit examined specimens of stools by the D. C. F., and Stoll's methods.

C. P.—Investigation into the prevalence of hookworm was carried out in Nagpur, Jubbulpore, Raipur, Narsinghpur, Akola and Amraoti jails.

Madras.—The rural sanitation campaign continued its anti-hookworm activities. Six units were at work in the districts of Vizagapatam, West Godavari, Coimbatore, Tinnevelly, Tiruvallur rural development area, South Arcot, Madura and Salem. The survey in Tiruvallur revealed a very high incidence rate, hookworm eggs being found in 90 per cent. of the stool specimens examined, the intensity of infection determined by egg counts in 1,877 cases was on the average 700 eggs per gram of faeces. In Saidapet also, an incidence rate of 45 per cent. among students of Y. M. C. A. School of physical education was noted.

Cinema shows, lantern lectures and talks were given to huge audiences. Over 193,000 treatments for hookworm were given by the rural sanitation dispensary and other staffs, while 2,512 new latrines were built mainly in Madura district.

Leprosy.

(*a*) *General.*

28. Although leprosy has been known in India for over 3,000 years, census enumerations have been the sole index of the extent of its prevalence since 1872, when the first census was taken. By these means, only advanced and obvious cases were registered by the lay census enumerators and many mistakes were made. The *purdah* system amongst Muhammedans and to a lower extent among Hindus prevented the detection of many female cases, and other cases were concealed for fear of social disabilities. The need for a better method of ascertaining the incidence of the disease became evident when shortly after the 1921 census, Dr. E. Muir, leprosy specialist at the Calcutta School of Tropical Medicine and Hygiene, enquired of 30 lepers whether they had been returned as such at the last census and found that only two of them had been so reported. Were the same proportion applicable throughout India, it followed that there were about 1,500,000 lepers in India instead of 102,513 actually recorded by the census staffs.

The year 1925 saw the formation of an Indian Council of the British Empire Leprosy Relief Association, a private organisation, with an endowment yielding an annual income of nearly 1¼ lakhs of rupees, having before it the following four methods of dealing ith leprosy problem in India.

(1) Educational propaganda.

(2) Training of doctors in the diagnosis and modern treatment of leprosy ;

(3) Research into the nature of the disease ; its prevention and methods of treatment;

(4) Surveys of endemic cases in order to obtain correct data about the incidence of leprosy, which may lead to the opening of treatment centres.

In early years this organisation, through its provincial branches, confined its activities to research, propaganda and the training of doctors, but in 1927 it began experimental surveys of selected areas to find out the relative incidence of leprosy in different parts of India, the classes of people among

whom it was most rife, and the causes of high incidence. These surveys, lasting from 2-12 days in each locality visited, have yielded surprising results, and have thrown considerable light on the magnitude of the problem, facing the provincial administrations, both Medical and Public Health. The areas surveyed included 4,560 villages in 30 districts and 66 *taluks* or municipal towns in ten British provinces and four Indian States. The main conclusions arrived at were :—

(*i*) Leprosy is much more prevalent in India than was formerly supposed ; probably a million cases would not be an overestimate.

(*ii*) Leprosy is most common among semi-aboriginals, or aboriginals who leave their tribal seclusion and hire themselves out to agriculturists or to industrial concerns.

(*iii*) Infection of other more advanced classes of the community is in the first place largely through the employment of servants in an infectious stage. Once the infection has entered a family, it tends to spread in that family and is often transmitted to friends and acquaintances.

(*iv*) Infection is probably very widespread and only develops into a clinically or bacteriologically recognizable case in a fraction of those infected, the natural resistance of the remainder being sufficient to prevent the disease developing.

(*v*) When leprosy does develop, it indicates either hyper-infection, or probably, more commonly, lowered resistance. This lowered resistance appears to be due chiefly to various factors affecting the general health, among which are diseases generally, improper diet, unhealthy habits, bad climate and bad surroundings.

(*vi*) Movements of population, which have increased on account of improved education, better transport, etc., in recent years, are a potent factor in spreading the disease and in infecting new areas.

During these surveys, as circumstances permitted, 287 doctors were trained and 100 clinics were set up in order to carry on the work, *viz.*, treatment, propaganda and detection of new cases. Thus a foundation has been laid for a campaign against this disease. Although even now the major portion of this campaign is on the shoulders of the Indian Council of the British Empire Leprosy Relief Association, provincial governments are taking more interest in the question of leprosy and are allocating funds for its prevention and treatment.

In the Madras Presidency the full seriousness of the leprosy problem was not realised till 1929, when the survey party of the B. E. L. R. A. demonstrated a high prevalence of the disease in certain areas. In 1930 a rough survey by the Public Health Department revealed 56,000 cases against 32,127 recorded in the previous census, and led to the inception of a group leprosy scheme. Under this scheme 6 special leprosy officers, each in charge of a group of districts, and one chief leprosy officer have been appointed. Through 400 clinics, no less than 120,000 leprous cases have to date been registered in this Presidency. The distribution of the disease is irregular but there are four principal foci : the North, Guntur, the Arcots and Salem and South East Malabar.

In Bihar and Orissa between 1929 and 1932, surveys were carried out in the districts of Puri, Muzaffarpur and Champaran and partial surveys in the districts of Monghyr, Cuttack, Sambalpur, Patna, Gaya, Palamau and Hazaribagh. These showed that the disease is confined to the poor living in overcrowded villages, amidst unhealthy surroundings and to the undernourished.

In the C. P., an intensive survey carried out in 1929 in 2,868 villages with a population of 1,367,113 in the Chhattisgarh division showed about 4,790 or 3 p. m. as against 3,135 lepers registered for the whole province during the last census ; on re-surveys 701 new cases were discovered in 1930.

In the Punjab, in 1931, a partial survey in Kangra district revealed a widespread prevalence of this disease, the leprosy officer detecting 44 lepers in 199 villages out of 956 surveyed. In 1932 a more detailed survey of endemic areas in this district detected 900 new cases.

In Burma a survey of the Minbu and Meiktila districts and of the Hlegu Health Unit area in 1932 showed that in these areas 16·49 *per mille* of population were infected, suggesting a figure of 241,537 lepers in the whole province, as against 11,127 recorded at the last census.

Since 1930, leprosy surveys have also been carried out in all the districts of Bengal, these have shown that the disease is endemic in every district and that in some districts the incidence is as high as 7 per cent., whilst the provincial rate has been recorded as about 1 per cent. In 1934, concentrated work in the most highly infected district of Bankura was commenced and a rural investigation centre was established to examine the possible control of leprosy in a limited area by concentrated work and to investigate the epidemiology of the disease by a careful study of its spread in villages over a prolonged period. A systematic survey of 150 villages of different unions of the Bankura, Raipur and Simlapal *thanas* has shown that (*a*) more than 78 per cent. of the villages are infected ; (*b*) one in every 6 families harbours leprosy cases ; 4·1 per cent. of the population are lepers. In round figures an estimate of 45,000 lepers in this district is not unjustifiable. Since on an average 2 of every 5 lepers are infectious and one in every 5 lepers is highly infectious, there must be approximately 18,000 infectious lepers in the district of whom 9,000 are highly infectious. The following five principal castes, in each of whom more than 1,000 persons were examined, showed the infection rate as given below :—

TABLE II (xlix).

	Families examined.	Families affected.		Persons examined.	Persons affected.	
		Number.	Percent.		Number.	Percent.
Muhammedans .	175	62	35·4	1,013	80	7·0
Tili . . .	235	58	24·6	1,399	71	5·0
Bauri . . .	582	106	18·2	2,859	136	4·7
Brahmin . .	327	55	16·8	2,000	62	3·1
Goala . . .	459	52	11·3	2,535	62	2·4

These remarkable figures have aroused much interest in provinces and many local Governments have either undertaken or propose to continue the survey work begun by the Indian Council of the B. E. L. R. A. In many provinces, grants-in-aid have been given by local Governments for the maintenance of asylums, homes and clinics. In Madras Presidency many district

boards have appointed their own leprosy officers, who conduct surveys in their respective areas, open clinics, train doctors, carry out propaganda and inspect school children for early signs of the disease.

As a sequel to these surveys, a network of clinics has sprung up in endemic areas and the numbers at work in 1934 are shown in the Table below :—

TABLE II (l).

Punjab	34
U. P.	118
B. & O.	50
Bengal	164
C. P.	28
Bombay	36
Madras	405
Assam	171
Burma	A few.

Through the generosity of the Indian Council of the B. E. L. R. A. and the authorities of the Calcutta School of Tropical Medicine, training in the modern methods of treatment has for some years been provided in Calcutta and the numbers of doctors trained hitherto is given in Table II (li). These officers have in turn trained numerous others in their respective areas.

TABLE II (li).

	1929-34.		1929-34.
Delhi	1	Baluchistan	4
Assam	31	Bangalore	1
Bengal	*94	Indian States—	
B. & O.	60	Hyderabad.	2
Bombay	8	Rajputana	13
Burma	13	Central India	32
C. P.	45	Western India	23
Madras	49	Bhopal	1
Punjab	19	Mysore	3
U. P.	32	Travancore.	2
N. W. F. P.	2		
		Total	436

* Includes 8 doctors from Jute Mills.

NOTE.—In addition, the leper home and hospital, Dichpalle (Hyderabad), has provided training for a total of 142 doctors to date.

Research.—The Calcutta School of Tropical Medicine first organised a research department in 1920, under Dr. E. Muir, assisted by Dr. J. M. Henderson and later by Dr. John Lowe. This Deptt. has been partly financed by the I. R. F. A. This department has studied a variety of problems in relation to the causation and cure of leprosy. In testing the relative efficacy of hydnocarpus and chaulmoogra oils, the former have been found more efficacious,

hydnocarpus esters are preferable to morrhuate ones and pure oil of *hydnocarpus wightiana* given by infiltration has been found to be less painful than esters. The study of syphilis as a complication of leprosy has shown that leprosy in itself does not cause a positive Wassermann reaction and such a positive reaction in a leper indicates the co-existence of syphilis. In these cases syphilis must be eliminated before leprosy is treated. It has been possible to produce primary lesions of leprosy in *rhesus* monkeys, if the animals undergo a preliminary sub-total thyroidectomy, but the disease was not found to generalise. Vaccines and metallic drug preparations proved less useful than hydnocarpus oil.

The "Mission to lepers" founded by Mr. Wellesley Bailey, 60 years ago, is another important private organisation which has devoted itself to the care and treatment of lepers. Although its activities now include more than 20 countries, India still remains its main field of work. There are at present 36 homes maintained from funds provided by the Mission; whilst 15 other homes received grants-in-aid from the Mission. Details of cases housed in the 36 homes maintained or managed by the Mission are included in Table II (lii) by provinces.

TABLE II (lii).

	No. of asylums.	Lepers. M.	Lepers. F.	Lepers. C.	Untainted children.	Total.
Punjab	3	314	162	4	116	596
U. P.	3	349	284	22	221	876
B. & O.	4	716	486	104	100	1,406
Bengal	2	169	152	22	38	381
C. P.	6	731	782	44	195	1,752
Bombay	7	411	270	53	76	810
Madras	6	682	190	82	94	1,048
Burma	2	269	88	57	14	429
Travancore	2	152	55	12	11	230
Central India	1	20	9	1	6	36
Total	36	3,813	2,479	401	871	7,564

M=Male. F=Female. C=Childern.

As a result of the detailed research and survey work carried out in India during the past ten years the leprosy problem has been defined and its dimensions guaged. Treatment has been substantially improved and early cases now come forward far more readily than formerly. Leper colonies are overcrowded and many lepers have to be refused admission for want of accommodation. The problem now facing those responsible for the management of these asylums, is to reduce the existing congestion by providing outside for the "burnt out" cases. Many local Governments and district authorities contribute towards the maintenance of these institutions in the form of capitation or other grants.

We still lack a sure satisfactory cure for the disease and a solution of the segregation problem: research must needs continue.

(b) Provincial.

N. W. F. P.—The Indian Council of the B. E. L. R. A. continued its contribution of Rs. 550 for anti-leprosy work. Of the 90 cases treated in hospitals, 68 were in Peshawar district alone, 15 in Dir, Swat and Chitral, 5 in Hazara and 2 in other places.

Punjab.—Under the auspices of the B. E. L. R. A. (Punjab branch), intensive surveys have been carried out in certain districts by a special officer. The province has now a total of 129 trained doctors. Medical students are given special courses in methods of diagnosing and treating leprosy. The five leper homes at Subathu, Ambala, Palampur, Tarn Taran and Rawalpindi under trained medical officers continued to be maintained by missions, the local Government giving grants-in-aid on a *per capita* basis. Inadequacy of accommodation has been reported due partly to "burnt out" non-infectious cases remaining in these institutions and partly to lepers from other provinces being admitted. Proposals to provincialise the post of leprosy officer, at present paid for by the B. E. L. R. A., were under consideration.

Anti-leprosy committees were formed at Kangra, Ludhiana and Murree. The number of clinics was 34 including 15 opened during the year.

U. P.—The skin (leprosy) dispensaries at Cawnpore, Benares and Lucknow continued to be maintained under the auspices of the provincial branch of the B. E. L. R. A., treating 738, 11,119 and 1,036 leprosy cases, respectively. Treatment was also provided at 118 dispensaries. For the maintenance of the Shrimati Bhagwan Devi leper home, the Municipal Board, Cawnpore, pays one-third and the local Government two-thirds of the cost.

B. & O.—There are six leper asylums at Gaya, Cuttack, Deoghar, Purulia, Muzaffarpur and Bhagalpur, two leper colonies at Puri and Saldaha in the Santal Parganas district, and 50 clinics. The asylum at Deoghar and the colony at Puri are maintained by public bodies; other institutions by missions, private donations and grants-in-aid from Government and local bodies. Of the clinics, 3 are maintained by the local Government, 3 by the Bettiah *Raj* and the rest by local bodies, the provincial committee of the B. E. L. R. A. giving grants-in-aid. The asylums and colonies, providing accommodation for 2,105, treated 2,198 patients at a total cost of Rs. 1,82,498.

Bengal.—Of the total, 1,109 cases were treated in medical institutions in Calcutta and 5,015 in the *mufassal*. The latter included 1,825 cases in the Burdwan division; 1,560 in Rajshahi division; 1,069 in Presidency division; 438 in Dacca division; and 123 in the Chittagong division.

C. P.—The anti-leprosy staff comprised a specialist and 17 specially trained medical officers. These latter were also employed on general anti-epidemic work which gave a serious setback to the anti-leprosy work, as only 537 villages were visited, not more than 52,709 injections could be given and the attendance at the 28 clinics and 32 sub-centres diminished from 71,189 in 1933 to 70,619.

The provincial Leprosy Fund, out of a total income of Rs. 16,483, gave grants totalling Rs. 2,472 to 7 leper asylums for the purchase of specific remedies and Rs. 4,835 for the five leprosy centres at Akot, Anjangaon, Morsi, Burhanpur and Khandwa.

In addition to 16 private practitioners, the trained staff consists of 1 assistant surgeons and 68 assistant medical officers.

"B. E. L. R. A."=British Empire Leprosy Relief Association.

Madras.—The anti-leprosy campaign was continued by the Medical and Public Health Deptts. Altogether 405 clinics were in operation as against 322 in 1933, 135 maintained by Govt., 199 by local bodies, 40 by subsidies, 23 by missions, and 8 private-aided. A total of 49,350 cases, or 11% more than those in 1933, attended, and injections given (903,050) showed an increase of 31%. Cutaneous cases with a high concentration of acid fast *bacilli* are reported to have responded very well to the "esters *cum* oil mixture". The D. P. H. remarks :—

"It is reported that about 15% of the cases treated at the clinics underwent treatment, long enough to be benefitted by it, while the rest discontinued after a few injections for various reasons, chief of which were (1) failure on the part of patients to see marked improvement within a short time, (2) the long course of treatment necessary : (3) the pain caused by the injections ; (4) the fear of social boycott ; (5) the loss of daily wages on the days they attended the clinics ; (6) the indifference to the disease as it does not cause serious inconvenience."

The 12 leper asylums provided accommodation for 2,100 lepers, the most important being the Lady Willingdon leper settlement at Tirumani in Chingleput district, capable of housing 750 patients.

The group leprosy officers, trained 107 doctors in anti-leprosy work opened new clinics and supervised the work of old ones ; conducted survey and attended to propaganda, registered cases and carried out medical examination of school children. The group leprosy scheme was extended for a further two years.

In order to ensure co-ordination, "leprosy relief councils" were at work in 19 of the 26 districts and these devised ways and means for the maintenance of the clinics. The Council in Salem district has under consideration a proposal to open a home for tainted children as well as demonstration centres for survey work and the follow-up of cases and possibly for voluntary village isolation.

Assam.—There were 126 clinics under the Medical Department and 52 under the Public Health Department, the latter receiving substantial financial support from the provincial leprosy relief committee. In addition, treatment was provided in the leper hospital, Kohima and the special ward at Dhubri, and lepers were housed in the asylums at Sylhet and Gauhati and the colonies at Tura and Jorhat. The Gauhati municipal asylum, constructed with grants from Government and the provincial relief fund, was opened in January. Treatment consisted of injections of hydnocreol, sodium hydnocarpate, E. C. C. O. and potassium iodide. Cases treated during the triennium, 1932-34, were of the following types:—

	Nodular.	Anaesthetic.	Mixed.
Gauhati leper asylum (figures for one year only)	18	31	38
Sylhet leper asylum	104	159	32
Kohima leper hospital	5	50	39
Jorhat leper hospital	13	25	15

Seven medical officers were trained locally in methods of treatment.

Of the 945 cases treated in hospitals and dispensaries, 310 were in the district of Kamrup, 218 in Goalpara, 176 in Sylhet, 71 in Sibsagar and 170 in certain other districts.

Burma.—Anti-leprosy activities in this province were confined to the consolidation of the progress already made in the districts of Minbu and Meiktila under the supervision of special officers and to the maintenance of colonies in Monywa and Kengtung (Southern Shan States). The leper colony opened in Minbu in December, 1933, had 34 leper inmates and that in Monywa 60, while the clinics in the towns of Sagu, Pwinbyu, Salin and Syinbyugyun in the former district did not draw sufficient attendances owing to their not being within reach of everyone. In Meiktila district, where a survey had revealed an incidence rate of 16·6 *per mille*, clinics were at work in Meiktila town, Mahlaing, Wundwin, and Thazi but funds were being raised for the establishment of a leper colony. The Mission leper colony in the Shan States housed 82 patients.

Rabies and Hydrophobia.

29. Table II (liii) gives the number of deaths from rabies in the rural and urban areas of British India and the provinces.

TABLE II (liii).

	Deaths.		Total.	
	Rural.	Urban.	1934.	1933.
Total	**2,561**	**355**	**2,916**	**2,684**
N.-W. F. P.	1	1	2	5
Punjab	125	35	160	159
Delhi	..	2	2	1
U. P.	623	37	660	551
B. & O.	158	18	176	172
Bengal	787	43	830	610
C. P.	109	25	134	201
Bombay	172	34	206	201
Madras	302	110	412	464
Coorg	..	..	..	..
Assam	74	3	77	50
Burma	210	47	257	270

N. W. F. P.—A total of 268 cases attended the local centres.

Punjab.—Deaths of males numbered 116 and females 44. A total of 5,384 cases were treated at the different centres, *viz.*, Pasteur Institute, Kasauli, 1,730, King Edward Medical College, Lahore, 3,305 and Rawalpindi centre 349, against 2,729, 3,669 and 309 respectively during the previous year. The D. P. H. remarks :—

"The large number of cases under this head emphasises once more the pressing need of adequate arrangements being made under the local bodies in the province for the destruction of stray dogs, in regard to which frequent complaints are brought to the notice of the officers of the Department."

C. P.—Of the cases treated at various centres, Nagpur had 561, Jubbulpore 221, Akola 193, Raipur 105 and Hoshangabad 91. Out of a total of

938 dog-bite or other bite cases recorded in municipalities and 393 cases in rural areas, 837 and 386 respectively were sent for treatment; of these 6 died, the condition of the others was unknown. The number of stray dogs destroyed during the year was 16,961.

Burma.—The death rate was 0·02, the same as in 1933 and the five-year mean. The number of persons treated for rabies during the year in all the treatment centres was 3,303, and the daily average attendance for treatment at the Pasteur Institute, Rangoon, was 74, compared with 64 in the previous year. Destruction of stray dogs was carried out in certain towns of the province, about 10,000 being destroyed.

Venereal Diseases.

30. As repeatedly stated in previous reports statistics of the incidence of "V. D.*" are not recorded for the general population nor it is possible to do so owing to certain practical difficulties, the more important being concealment which, in the present state of education, renders notification impracticable. Satisfactory facilities for the treatment of these diseases have not been extended beyond headquarter towns in most provinces and except in Bombay, Madras and Bengal, specialist staffs have not yet been employed. In order to obtain some idea of prevalence, inferences have to be based on indirect evidence consisting chiefly of reports of Public Health Officers; attendances at hospitals and dispensaries; incidence in the Army and in jails. In addition, the high rates of still-births, and infantile mortality in India suggest a high prevalence of venereal infection in this country. Also some of the blindness in India must be attributed to venereal disease.

The indications are that high incidence occurs mainly among the poorer classes; in the great seaport cities, in other large towns in the interior and in certain hill tracts especially the Himalayas.

There is evidence that these infections are commoner in Madras, Bengal, U. P., C. P. and B. & O. than in other provinces in India. The Surgeon General, Madras, in his Annual Report on Hospitals and Dispensaries for 1934, says :—

"From all the evidence available it appears that the incidence of venereal diseases in rural parts of this province is very heavy and an attempt is being made to ascertain its actual gravity. Among the poorer classes it is probably over 50% and in some places more. The treatment of the disease is not on a very satisfactory basis partly because many patients will not attend owing to ignorance and shame and partly because proper clinics are not sufficiently widespread."

Treatment, education and propaganda are the greatest needs. In certain areas, a drive against commercialised prostitution has been launched and in several large towns brothels have been declared illegal. Many infections must occur at fairs and festivals. During the Sonepore fair in Behar in 1934 a census of prostitutes showed the presence of 276 within the *mela* area. In other large *melas* and fairs conditions are similar. The campaign against commercialised prostitution, *i.e.*, against the brothel keepers and kidnappers of girls and their financial backers, is sound and requires to be pursued with determination. Victimisation of the prostitutes themselves can do no good.

Hospitals returns of cases treated during 1934 show a decrease except in Madras, Bengal and N. W. F. P. Cases treated are shown in Table II (liv). A fairly large proportion of the syphilitic cases are congenital.

* "V. D." = Venereal diseases.

TABLE II (liv).

	1933.				1934.			
	Gono-coccal infection.	Syphilis.	Total.	% of total.	Gono-coccal infection.	Syphilis.	Total.	% of total.
Total	**291,351**	**335,439**	**626,790**	**0·8**	**295,451**	**333,691**	**629,142**	**0·8**
N.-W. F. P.	1,731	7,196	8,927	..	2,078	7,571	9,649	..
Punjab	13,472	18,178	31,650	..	13,662	17,703	31,365	..
Delhi	6,976	7,299	14,275	1	4,902	4,542	9,444	1
U. P.	27,343	40,280	67,623	1	26,141	41,309	67,450	1
B. & O.	27,053	39,200	66,258	1	25,895	38,697	64,592	1
Bengal	48,024	35,916	83,940	1	49,663	36,576	86,239	1
C. P.	14,247	18,081	32,328	1	11,712	15,373	27,085	1
Bombay	21,188	28,216	49,404	1	22,157	28,247	50,404	1
Madras	103,118	107,019	210,137	1	112,735	111,481	224,216	1
Coorg	311	168	479	..	289	109	398	..
Assam	4,743	2,234	6,977	..	4,476	2,141	6,617	..
Burma	23,140	31,652	54,792	2	21,741	29,942	51,683	2

In addition, 2,892 cases were treated in the Punjab for other " V. D.". 4,175 in the U. P., 3,811 in the C. P. and 77 in Coorg.

In 1933, Sir John Megaw, the then Director General, Indian Medical Service, on the basis of an investigation reported the incidence of syphilis as 5,506,800 cases or 16 *per mille* and of gonorrhoea 7,589,500 or 22 *per mille* in the rural areas.

Separate figures for rural and urban areas are not available but incidence in the large towns is probably considerably higher than that in the country districts.

The provincial Medical and Public Health Administrations continued their activities, though on a very modest scale, to combat the spread of these diseases. In Delhi Province a venereal diseases hospital was opened in Delhi city. In Madras arrangements for treatment exist at all hospitals and dispensaries, but the venereal department of the Government General Hospital, Madras, is the largest clinic in South India, providing for both in and out-patients for both sexes. Nineteen medical men and women have been specially trained in V. D. work during the three years, 1932—34, in the hospital where 6,708 new cases, comprising 5,474 men, 1,102 women and 132 children were treated. Of these cases, 554, *viz.*, men 312, women 215 and children 27 were in-patients while the daily outdoor attendance averaged 142. During the last three years, 27 merchant seamen were also given treatment in this clinic. In Assam an anti-syphilitic campaign has been concentrating on treatment. Prior to 1932, venereal clinics were maintained by the local Government in 27 Government and local fund hospitals in Burma but only a few of these in Government institutions survived the financial stringency. In Bengal, free expert treatment is provided in Government hospitals. In some hospitals, whilst diagnosis is made free, drugs are paid for.

Treatment of government servants and of seamen continued to be provided at the hospitals listed on page 90 of the Report for 1933.

Yaws.

31. *C. P.*—The prevalence of the disease was reported in the contiguous areas of the northern parts of the Nizam's Dominions, the south western parts of Bastar State and the periphery of Chanda district in the C. P. bordering on the former two areas.

Assam.—Cases treated in hospitals and dispensaries totalled 2,739 as against 260 in 1933 and included 1,826 in Goalpara, 208 in Cachar and 85 in Kamrup district. In addition, the public health staffs treated 3,089 cases (1,215 in 1933). The increase in these figures is the result of intensive propaganda.

Burma.—The disease is very prevalent in the districts of Mergui and Tavoy and was confined to the Salons, Malaya and Siamese in the former district. In Upper Chindwin district it is common in the old Maingkaing and Mingin townships. In the districts of Sagaing, Lower Chindwin, Katha and the Chin Hills, it is also reported to be fairly common.

Kala-azar.

32. *U. P.*—Of a total of 423 recorded deaths, 382 were in rural and 41 in urban areas. Amongst rural districts high mortality occurred in Basti 107 deaths (0·05 p.m.) and Allahabad 86 (0·06 p.m.).

B. & O.—The disease is most prevalent in North Bihar, in the districts of Saran, Muzaffarpur and Darbhanga in Tirhut division and in Purnea district in Bhagalpur division. Other districts in Bihar proper are moderately infected while the Orissa and Chota Nagpur divisions are practically free. The local Government continued its annual grant of Rs. 10,000 for the purchase of urea stibamine and other allied drugs for the treatment of kala-azar cases, which numbered 58,547 in 1934.

Bengal.—Deaths totalled 14,763—14,124 in rural and 639 in urban circles. The largest number of deaths occurred in the rural districts of Dinajpur 2,175, Tippera 1,859, Bakarganj 1,543, Dacca 1,175, Rangpur 1,120 and Noakhali 1,032. Of the urban mortality 110 deaths were reported in Dacca and 210 in Calcutta. Compared with 1933, urban mortality decreased by 10%, that in Calcutta by 10·5% ; whilst in rural areas an increase of 11% in the death rate was recorded.

Madras.—Of the 4,327 cases treated in hospitals and dispensaries, 1,155 were recorded in Tinnevelly district alone ; other high figures included 752 cases in Madras town and 716 in Vizagapatam.

Assam.—Of the 5,558 patients who attended medical institutions, 1,541 and 1,137 or over 48% of the total were treated in the districts of Sylhet and Kamrup. In other districts the numbers treated were 723 in Sibsagar, 621 in Goalpara, 578 in Nowgong and 3 and 5 cases, respectively, in Sadiya and Balipara Frontier Tracts.

Altogether 13,398 cases were treated in 1934 with 770 deaths compared with 12,650 cases and 749 deaths in 1933. Increased incidence was reported in the districts of Cachar, Sylhet, Darrang, Nowgong, Sibsagar and Garo Hills, and civil surgeons have been instructed to report promptly all recrudescences so that preventive measures may be taken. Table II (lv) gives the figures for 1932—34.

TABLE II (lv).

	1932.		1933.		1934.	
	C.	D.	C.	D.	C.	D.
Total	**11,958**	**987**	**12,650**	**749**	**13,398**	**770**
Cachar	391	4	472	2	529	6
Sylhet	4,719	296	4,210	146	4,612	22
Goalpara	1,089	122	1,159	92	1,107	61
Kamrup	2,061	152	2,223	129	2,197	151
Darrang	665	155	757	167	876	136
Nowgong	1,075	132	1,663	110	1,726	78
Sibsagar	1,269	78	1,251	64	1,372	84
Lakhimpur	12	2	13	4	18	..
Khasi and Jaintia Hills	..	..	1	..	5	4
Naga Hills	16	1	12	1	14	..
Lushai Hills	2	1	1	..	..	..
Garo Hills	605	43	850	34	927	23
Sadiya Frontier Tract	1	1	2	..	1	..
Manipur State	53	..	36	..	14	..

Other provinces.—Thirty-eight cases were treated in the Punjab, 9 in C. P. and 102 in Burma. Bombay Presidency, N. W. F. P. and Delhi had no cases.

Relapsing fever.

33. Table II (lvi) gives the numbers of cases treated in hospitals and dispensaries in the different provinces.

TABLE II (lvi).

	1934.	1933.
Total	**7,588**	**4,982**
N. W. F. P.	41	20
Punjab	379	236
Delhi	14	23
U. P.	2,280	446
B. & O.	1,109	635
Bengal	2,116	2,078
C. P.	170	149
Bombay	151	103
Madras	1,166	1,221
Coorg	..	..
Assam	..	7
Burma	162	61
Baluchistan	..	3

N. W. F. P.—A total of 27 cases attended medical institutions in North Waziristan, 8 in Kurram and 6 in other areas.

Punjab.—The Public Health Department detected 12 cases in Amritsar and Montgomery each, 3 in Mianwali and one in Sialkot. Of the cases treated in medical institutions 151 were recorded in Jhelum, 58 in Gujranwala, 27 in Attock, 23 in Lahore and 20 in Shahpur district.

U. P.—Whilst the ordinary registration agency reported 449 deaths in rural and 114 in urban areas as due to this disease, special reports by civil surgeons and District M. O. Hs. indicated that no epidemic occurred in any district. On the other hand, 1,751 cases or 77% of the total treated in hospitals and dispensaries were recorded in Lucknow district alone.

B. & O.—Judging from hospital returns, incidence was high in the districts of Bhagalpur 204 cases, Gaya 151, Muzaffarpur 125 and Palamau 118.

Bengal.—Compared with 1933, the number of recorded deaths 2,720 decreased by 90% due to improved registration. In previous years most of the so-called relapsing fever cases registered in this Presidency were due to malaria or other fevers in which relapses are a common feature. Only 3 deaths were recorded in urban areas.

Of the total, 730 attended hospitals and dispensaries in districts in the Presidency division ; 489 in Dacca division ; 349 in Burdwan division ; 282 in Rajshahi division ; 186 in Calcutta ; and only 80 in Chittagong division.

C. P.—A total of 6,090 deaths was ascribed to relapsing fever, but the D. P. H. has reasons to treat this figure as incredible. He says :

"This is altogether erroneous and unreliable as, during the course of my inspection of towns, I discovered that in the absence of a separate column for deaths from undiagnosed fevers in the old form of death register used, all such deaths were wrongly shown in the column for relapsing fever."

Even the 170 patients treated as relapsing fever in medical institutions are doubtful cases as none were microscopically confirmed.

Madras.—Over 63% of the total cases treated in medical institutions (1,166) were in the districts of Vizagapatam (102), West Godavari (165), Chingleput (365) and Salem (105).

Assam.—Only one death was reported in Jorhat town.

Influenza.

34. Most of the influenza deaths during a mild epidemic are included under the convenient heading of " fevers " or are recorded under respiratory diseases, as death frequently results from complications of this nature. In Bengal, mortality from this cause decreased by 20% ; deaths numbered 4,124—3,454 in rural areas, 597 in Calcutta and 73 in other towns. The Punjab, where the infection was localised, reported an increased incidence, 6,986 attacks and 17 deaths in 14 out of the 29 districts. The districts of Montgomery (2,614) and Muzaffargarh (1,352), reporting 57% of the total cases, were severely affected ; Amritsar, Sialkot, Mianwali, Kangra and Sheikhupura, recording 42% of the total, reported less severe infection. In the U. P. mild outbreaks occurred in several districts. In Bombay Presidency with 329 recorded deaths, the type of the disease was mainly respiratory. In the C. P., the disease prevailed in a mild form, causing 2,331 deaths ; recorded cases in the affected tracts numbered 12,823 in Jubbulpore, 12,341 in Nagpur, 8,879 in Akola, 6,448 in Nimar, 6,158 in Buldana, 5,781 in Yeotmal and 5,377 in Amraoti. In Burma 73 deaths were reported in towns.

Goitre.

35. *U. P.*—Cases were recorded among school children in the districts of Ballia (5), Garhwal (8) and Gorakhpur (82) and in the towns of Pilibhit (38) and Bahraich (149). Lt.-Col. H. Stott, I.M.S., Professor of Pathology, King George's Medical College, Lucknow, who has made a study* of the incidence of the disease in the super-endemic areas of Gonda and Gorakhpur reports :—

"Goitre is rare below the age of three years. Between 3 and 5 years the rate in the two super-endemic areas visited is less than 5%, though this percentage rises higher in severely affected areas. Children between 6 and 14 years were examined in many schools and the incidence was 10—20 per cent., but the rate may reach 80 per cent. in areas of greatest endemicity. Between 15 and 30 years the rate rose to 60% and fell again above 30 years. In the most severely affected areas of Padrauna (*tehsil*) the rate was 90% above the age of 5 years."

He further reports that very few educated and well-to-do persons acquire this disease, which is definitely more prevalent among females, probably for every one male 3 females are infected.

Assam.—During a survey of two villages in the Naga Hills and of 26 villages along the banks of Dikhu river in Sibsagar district 228 and 747 cases, respectively, were detected. The latter included 474 females.

Burma.—Goitre is reported to be prevalent amongst the Palaungs and the Kachins living at comparatively high altitudes in the Northern Shan States, very common in the Falam sub-division in the Chin Hills ; common in the townships of Tilin, Saw, Gangaw and Pauk in Pakokku district and in the Lejktho township in Toungoo district.

Guineaworm.

36. *U. P.*—Cases treated in hospitals and dispensaries in the province during the year 1934 totalled 2,553.

Punjab.—Cases treated in medical institutions totalled 2,518 including 868 in Hoshiarpur, 391 in Hissar and 217 in Attock. Presence of the disease was reported from many other districts.

C. P.—Cases treated in hospitals and dispensaries numbered 495 including 213 in Chanda, 37 in Chhindwara, 36 in Saugor, 26 in Yeotmal, 23 in Jubbulpore and 21 in Buldana. The abolition of step-wells was under consideration and instructions for purification and prevention of water pollution were issued.

Diphtheria.

37. *Punjab.*—The disease was reported in 19 districts ; cases and deaths totalled 162 and 60, respectively. The case mortality was 37%.

Rawalpindi district recorded 28 cases and 6 deaths ; Lahore district 25 and 6 ; Kangra 19 and 5 ; Simla 18 and 3 ; Amritsar 15 and 13 ; Lyallpur 10 and 4, and 47 and 23 in 13 other districts.

U. P.—Malignant forms of the disease are entirely absent. Overcrowding in dormitories in schools is mentioned as a factor in the spread. Paralysis incidence is moderate.

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* I. J. M. R., Vol. XXI, No. 3, January, 1934.

Bengal.—In Calcutta the virulent form of the disease prevails to a moderate extent. Streptococcus haemoloticus, is so prevalent that it is now the routine to administer 10 c.c. of anti-streptococcus serum with the first anti-toxin injection. Almost all diphtheria cases show some degree of myocarditis, while the various forms of heart block are not uncommon.

C. P.—Of the 150 cases (deaths 5) recorded, 79 were in Hoshangabad, 15 in Bilaspur, 13 each in Jubbulpore and Raipur and 6 each in Nagpur, Saugor and Nimar.

In B, & O. and Assam the disease is not common.

Bombay.—In Karachi town where this disease is notifiable, 177 cases with 30 deaths occurred. Inoculations (4,036) were performed especially among school children and other contacts. Six deaths were recorded in the Northern Registration district—4 in Surat and 2 in Ahmedabad towns. Diphtheria is more or less endemic but malignant forms are noticed only during epidemic periods. The disease is seasonal and assumes epidemic form during or after the rains, important factors being the presence of large number of carriers and many children with neglected or untreated throat conditions. Anti-diphtheritic vaccination has been used fairly widely among school children.

Typhus Fever.

38. *Punjab.*—One case of typhus fever (louse variety) was treated in a hospital in Jullundur district.

U. P.—A total of 1,111 cases with 10 deaths was recorded in hospital returns —16 louse borne, 117 tick typhus and in 978 the vector was unknown. The largest number of cases were treated in the districts of Agra 186 cases, Allahabad 44, Benares 45, Basti 95, Moradabad 134, Unao 131 and Pilibhit 66.

C. P.—Two cases of tick typhus in the districts of Nimar and Amraoti and 33 other cases in which the vector was unknown were treated in Drug district.

Burma.—The D. P. H. reports—

"In the year 1933, the Director, Pasteur Institute, Rangoon, reported a certain number of positive findings when the Weil Felix test was done on blood specimens submitted to him. This drew attention to the possible prevalence of typhus or typhus-like fevers in the province, and all civil surgeons were asked by the Inspector General of Civil Hospitals, Burma, to send specimens of blood serum for examination from cases which possibly suggested typhus or typus-like fevers. Between January and April 1934, the Civil Surgeon, Henzada, sent specimens from 7 suspected cases, and of these 3 were reported by the Director of the Pasteur Institute as positive typhus of the "shop" type. The remaining cases are stated to be probably typhus of the "scrub" type. Altogether 18 positive findings were reported during the year by the Pasteur Institute. With a view to obtaining data regarding the prevalence of this disease in Burma, the Local Government has declared this group to be a dangerous disease notifiable within all municipalities and notified areas in Burma. An investigation into the history of most of the cases has up to now failed to reveal any particular factor which might be concerned in the infection."

Osteomalacia.

39. *Delhi Province.*—Although the incidence of this disease is not known, it is present in this province. In the St. Stephen's and Lady Hardinge College

Hospitals, 179 cases were treated, of whom 10 died. Table II (lvii) gives the distribution by communities of the 61 cases treated in St. Stephen's Hospital. Figures for 1933 have been included for comparison.

TABLE II (lvii).

	1933.		1934.	
	C.	D.	C	D.
Hindus	51	3	39	6
Muhammadans	17	1	16	..
Christians	3	..	..	..
Total	71	4	55	6

The frequency distribution of these cases by pregnancies is given in Table II (lviii).

TABLE II (lviii).

	1933.		1934.	
Order of Pregnancy—	C.	D.	C.	D.
1st	24	1	10	..
2nd	11	2	8	..
3rd	9	1	15	2
4th	7	..	3	1
5th	8	..	9	1
6th	6	..	2	..
7th	2	..	2	..
8th	1	..	2	..
and over	3	..	4	2
Total	71	4	55	6

The principal aetiological factors are said to be (*a*) unbalanced and poor diet, (*b*) early marriage and conceptions, and (*c*) unhygienic living conditions.

Punjab.—Cases treated in medical institutions totalled 971 and included 284 in Amritsar and 402 who attended the Lady Willingdon Hospital, Lahore.

U. P.—Hospital returns showed a total of 2,723 cases, the largest numbers being recorded in the districts of Meerut 1,066, Benares 293, Aligarh 114, Bulandshahr 122, Fyzabad 167, Lucknow 196 and Shahjahanpur 193.

C. P.—The distribution of the 283 cases treated in 10 out of 19 districts was Drug 73, Jubbulpore 54, Saugor 53, Akola 35, Nagpur 27 and others 41.

Diabetes.

40. This disease is not recorded as a cause of death in the general population in India, not even in the larger towns and cities but it is believed to be fairly widely prevalent especially among the rich and educated classes. Cases treated in hospitals and dispensaries only are available and these are given in Table II (lix).

TABLE II (lix).

	1934.	1933.	1932.
British India	31,321	28,264	27,560
N.-W. F. P.	623	778	354
Punjab	2,800	2,504	2,454
Delhi	128	120	138
U. P.	2,402	2,182	2,059
B. & O.	2,796	2,760	2,873
Bengal	3,645	3,100	3,111
C. P.	541	554	508
Bombay	2,359	2,117	2,234
Madras	14,944	12,932	12,846
Coorg	34	..	19
Assam	162	242	203
Burma	884	941	682
Baluchistan	Not available.	34	79

The correlation between the incidence of diabetes and the dietetic habits of the people has been the subject of study by Dr. J. P. Bose at the Calcutta School of Tropical Medicine and by Dr. K. C. Paul, diabetic specialist at the Government General Hospital, Madras.

(*a*) In Calcutta, an attempt was made to collect statistics of mortality in the registered areas of Calcutta and suburbs for the last few years in order to study the correlation, if any, between the sugar content and the cholesterol content of the blood in normal healthy Indians on different diets and also in cases of diabetes treated by different systems of dieting. It was reported that the diet of the Bengalees can usually be divided into three distinct classes :—

(1) That of the rich class (the class which get diabetes most)—usually a very high carbohydrate, very high fat and a high caloric diet.

(2) That of the middle class—a high carbohydrate, low protein and low caloric diet.

(3) That of the poor class—a high carbohydrate, low protein, low fat and a low caloric diet—the incidence of diabetes among this class is very rare.

Undoubtedly the incidence of diabetes is highest amongst the Bengalee Hindus of the rich and indolent classes. Statistics of 1,500 cases of diabetes amongst the different races in India show that the percentage of incidence is 66·2% among the Hindus * and amongst these about 56% are Bengalee Hindus.

Table II (lx) gives the mortality from diabetes in relation to sex, nationality and age in Calcutta including suburbs during the years 1929-33.

* Bose, J. P., Handbook of Diabetes Mellitus and its modern treatment, 2nd Edition, 1934, pp. 31, 32.

TABLE II (lx).

For the year.	Total Diabetic mortality.	Sex.		Nationality.			
		Male.	Female.	H.	M.	A. I.	O. C.
1929	57	53	4	52	3	...	2
1930	89	69	20	74	10	3	2
1931	105	91	14	76	24	3	2
1932	93	83	10	75	12	2	1
1933	125	95	30	92	31	1	1

Age (in years).												Death rate per cent. in relation to total deaths.	Rate per 100,000 population.
Below 15.		15—20.		20—30.		30—40.		40—50.		50—60.		60 and upwards.			
M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.		
...	...	...	...	...	...	6	1	10	...	18	2	19	1	0·17	5·2
...	...	...	...	...	...	5	2	7	1	31	10	16	7	0·27	8·3
...	...	...	...	...	...	...	...	9	4	42	4	40	6	0·34	8·7
...	...	...	...	1	2	6	...	...	...	17	4	59	4	0·31	7·7
...	...	...	...	...	...	...	...	...	...	60	10	35	20	0·35	10·4

H.-Hindus. M.-Muhammadans. A. I.-Anglo-Indians. O. C.-Other Classes.

(*b*) The Madras report, based on a careful analysis of a series of 680 cases, is interesting and its main conclusions are summarised below:—

(1) Incidence is higher in persons whose body weight is above the optimum for age and height. Overweight, as an antecedent factor, was present in 494 of the 680 cases.

(2) The cause of the overweight is uncertain since an analysis of dietary habits does not show an excess of fat in the diets of the majority. Excess carbohydrates intake was noted in 436 cases in conjunction with sedentary habits. Excess of sweets, which contain much *ghee* is taken by the wealthier *Brahmins*, Nattukoti *Chettiars*, Muhammadan merchants and landowners who consume from 2 to 4 oz. of *ghee* daily.

(3) A family history of diabetes was present in 53% of cases—parent in 34% and brother and sister in 19%. The diabetic tendency is traceable to the family environment, which often remains the same through several generations.

(4) Probably 1% of the population of South India is diabetic, the distribution among cases from districts being—

Madras city and Chingleput	188
Malabar, Cochin and Travancore	89
Tanjore	67
Coimbatore	49
Madura	44
Guntur	27
Godavari	21
North Arcot	22
South Arcot	18
Tinnevelly	15
Kistna	9
Cuddapah	5
Coorg	4
Ganjam	3
Mysore	39

(5) It is noted that in the non-vegetarian, diabetes tends to be of a severer type than in the vegetarian.

Cancer.

41. Table II (lxi) gives the number of cases of new growths treated in hospitals and dispensaries in the different provinces.

TABLE II (lxi).

	Malignant.		Non-malignant.	
	Cases.	Deaths.	Cases.	Deaths.
Total	**39,773**	**839**	**70,167**	**203**
N.-W. F. P.	306	9	1,028	5
Punjab	7,241	67	12,763	32
Delhi	452	11	550	6
U. P.	1,196	21	7,947	41
B. & O.	2,694	50	6,876	15
Bengal	4,053	170	7,990	35
C. P.	1,234	26	1,762	8
Bombay	2,852	167	3,516	13
Madras	16,367	230	24,374	37
Coorg	1,819	..	30	..
Assam	227	4	627	..
Burma	1,332	84	2,704	11

The Radium Institute in Bihar and Orissa has been moved from Ranchi to Patna and provides for 18 patients (males 12 and females 6). Of 804 cases treated, 109 became clinically free, 26 were cured, 293 were improved and 25 died.

Of the 204 deaths recorded in urban areas of Burma, 69 were in Rangoon, 24 in Mandalay, and 111 in other urban centres. Mortality in Rangoon by classes and age is included in Table II (lxii). Of the total, 64 (males 38 and females 26) were local and 5 (males 4 and female 1) were imported cases.

TABLE II (lxii).

Ages.	Burmese.		Hindus.		Muhammadans.		Chinese.		Anglo-Indians.		Others.	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
Under 30 yrs.	..	..	3	...	..	..	..	..	...	..	..	..
30—40 „	2	1	4	..	1	...	1	1	...	..	..	1
40—50 „	1	6	3	1	2	2	1	1	1	..	1	..
50—60 „	3	2	3	2	3	..	5	..	..	..	..	..
Above 60 „	4	5	3	2	..	...	..	2	...	..	1	1
Total	10	14	16	5	6	2	7	4	1	..	2	2

In Bombay city 31 deaths were due to cancer of the buccal cavity, 64 of the pharynx, oesophagus, stomach and liver; 16 of the peritoneum, intestines and rectum, 21 of the female genital organs; 13 of the breast; 3 of skin; and 111 of other unspecified organs.

The inquiry into the incidence of cancer under Dr. Vishwanath, Professor of Pathology, King Edward Medical College, Lahore, financed by the I. R. F. A. was pursued in Madras and Rangoon. Records of 3,150 medico-legal and 2,454 pathological autopsies in Rangoon were studied. The incidence of malignant disease worked out at 5·4 *per mille* in the former group

and 39·0 *per mille* in the latter. Of 2,814 biopsy examinations made in the same institution, as many as 740 showed malignant disease. Of 58,972 in-patients treated in the Rangoon General Hospital 854 suffered from malignant neoplasms.

In Madras records of 13,874 pathological post-mortems were studied. The incidence of malignant disease in this group proved to be as high as 2,229. From hospital records of 192,939 in-patients, malignant disease was found to be recorded in 5,035 cases.

A paper embodying the results of this investigation has been published in the I. J. M. R. July 1935.

C. S. Meningitis.

42. *N.-W. F. P.*—Of the 64 cases registered 26 or 41% were fatal. These cases were distributed as follows:—32 cases with 11 deaths in Peshawar; 27 and 13 in D. I. Khan; 4 and 1 in Hazara; and 1 fatal case in South Waziristan.

Punjab.—The epidemic was mild and was responsible for 275 attacks and 152 deaths which gave a case mortality of over 55%. Although every district was infected, the districts in Ambala division in which infection was said to have been imported from Delhi Province, suffered most with 464 cases and 318 deaths, giving a case mortality of 69%. Ten cases, of which 7 proved fatal, were recorded in Simla town; 57 cases with 28 deaths in jails were distributed as follows: Lahore Borstal Institution, 34 and 10; Jhang district, 10 and 10; Lahore central, 5 and 3; Multan central, 3 and 3; Sialkot district, 3 and 1; and Ferozepore district 2 and 1.

Delhi.—Delhi city with its congested areas and conditions peculiar to itself recorded 411 cases and 290 deaths out of 464 cases and 320 deaths recorded in the whole province. The incidence in New Delhi was 27 cases with 9 deaths; notified area, 23 and 20; Shahdara 2 and 1; and the rural areas reported one non-fatal case. Tables II (lxiii) and (lxiv) give the incidence by months, community and sex.

TABLE II (lxiii).

Months.	Delhi City.		New Delhi.		Notified area Civil Lines.		Delhi-Shahdara.		Rural Areas.		Total.	
	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.
Total	411	290	27	9	23	20	2	1	1	...	464	320
January	16	16	3	1	...	...	...	...	...	...	19	17
February	28	21	1	...	...	...	...	...	...	...	29	21
March	69	42	6	3	11	4	...	...	1	...	87	49
April	62	40	5	1	3	5	...	...	...	...	70	46
May	72	52	5	3	1	2	...	...	...	...	78	57
June	30	22	1	...	...	...	...	...	...	...	31	22
July	28	16	...	...	1	1	...	...	...	...	29	17
August	26	22	3	...	2	3	1	...	...	...	32	25
September	17	12	...	1	2	3	...	...	...	...	19	16
October	21	17	...	...	...	...	...	...	...	...	21	17
November	20	13	2	...	2	1	1	...	...	...	25	14
December	22	17	1	...	1	1	...	1	...	...	24	19

TABLE II (lxiv).

Classes and Sex.	Delhi City.		New Delhi.		Notified Area Civil Lines.		Delhi-Shahdara.		Rural Areas.		Total.	
	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.
All Classes .	411	290	27	9	23	20	2	1	1	...	464	320
Males .	309	207	17	6	18	17	2	1	1	...	347	231
Females .	102	83	10	3	5	3	...	...	...	...	117	89
Hindus . .	252	187	15	6	10	10	2	1	...	...	279	204
Males .	190	135	8	4	10	10	2	1	1	...	190	135
Females .	62	52	7	2	..	..	...	...	...	...	60	54
Muhammadans.	158	102	12	3	9	8	...	...	...	...	179	113
Males .	119	72	9	2	8	7	...	...	...	...	136	81
Females .	39	30	3	1	1	1	...	...	...	...	43	32
Christians .	1	1	...	...	4	2	...	...	...	...	5	3
Males .	...	...	...	...	...	...	...	...	...	...	...	...
Females .	1	1	...	...	4	2	...	...	...	...	5	3

The male morbidity and mortality were more than double the females. Muhammadans suffered more (9 per 10,000) than Hindus (7 per 10,000).

U. P.—The disease was made notifiable in April. From January it was present in sporadic form in Agra and Cawnpore. Nowhere was it epidemic but cases kept being reported from the towns of Aligarh, Meerut, Bareilly, Fyzabad, Lucknow, Benares, Farrukhabad, Brindaban, Hapur, Amroha, Jhansi, Muttra, Naini Tal, Allahabad, Moradabad, Saharanpur, etc. Distribution was irregular and sudden. Proved cases of direct contagion were few. Case mortality ranged from 35—50%.

All communities were attacked but males have been more susceptible than females. The rate of mortality amongst Hindu females was greater than that amongst the males. People between the ages of 10 to 25 have been mostly attacked and Muhammadans of ages between 10 and 20 appear to be more susceptible than Hindus of the same age.

Table II (lxv) gives recorded deaths by age, sex and class.

TABLE II (lxv).

	Hindus.				Muhammadans.				Christians.				Others.				Total.			
	Male.		Female.		Male.		Female.		Male.		Female.		Male.		Female.		Male.		Female.	
	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.
Total .	152	86	39	24	93	52	25	13	2	1	..	..	2	..	..	..	249	139	64	37
Under one year .	1	1	2	1	1	1	..	..	..	..	..	..	..	..	..	..	2	2	2	1
1—5 years . .	12	5	3	3	8	..	2	1	..	..	..	..	..	..	..	..	20	5	5	4
5—10 ,, . .	18	11	8	3	8	11	12	5	..	..	..	..	..	..	..	..	26	22	20	8
10—15 ,, . .	39	20	6	4	21	16	4	4	..	..	..	..	1	..	..	..	61	36	10	8
15—20 ,, . .	31	18	5	4	25	12	4	2	2	1	..	..	1	..	..	..	59	31	9	6
20—25 ,, . .	22	10	5	3	15	4	3	1	..	..	..	..	..	..	..	..	37	14	8	4
25—30 ,, . .	11	8	6	3	5	4	..	..	..	..	..	..	..	..	..	..	16	12	6	3
30—35 ,, . .	8	6	2	..	4	3	..	..	..	..	..	..	..	..	..	..	12	9	2	..
35—40 ,, . .	4	2	1	1	3	1	..	..	..	..	..	..	..	..	..	..	7	3	1	1
40—50 ,, . .	5	4	..	1	3	..	..	..	..	..	..	..	..	..	..	..	8	4	..	1
Over 50 ,, .	1	1	1	1	..	..	..	..	..	..	..	..	..	..	..	..	1	1	1	1

B. & O.—Reported cases numbered 31 with 12 deaths and included 18 cases with 6 deaths in Muzaffarpur district; one non-fatal case in Gaya; two fatal cases in Ranchi; 7 and 3 in Patna; and 3 and 1 in Cuttack.

Bengal.—Cases totalled 828 in Calcutta; 33 (males 31 and females 2) in Howrah; and 6 (males 4 and females 2) in Baranagar. Table II (lxvi) gives the cases treated in the Campbell Hospital, Calcutta, by age, sex and months.

TABLE II (lxvi).

	Hindus.		Muslims.		Other castes.		Total.
	M.	F.	M.	F.	M.	F.	
Total	**535**	**87**	**136**	**7**	**6**	**1**	**772**
January	44	1	8	..	1	..	54
February	70	5	17	..	..	..	92
March	48	16	15	1	1	..	81
April	35	9	15	3	1	..	63
May	47	6	12	..	..	..	65
June	27	3	7	1	1	1	40
July	30	6	8	..	..	..	44
August	45	5	7	..	1	..	58
September	52	9	13	1	..	..	75
October	30	6	6	..	..	..	42
November	42	11	9	..	..	..	62
December	65	10	19	1	1	..	96

C. P.—Only 18 cases with 3 deaths were reported—8 each in Nimar and Akola and one each in Nagpur and Chhindwara.

Bombay.—A total of 555 deaths was ascribed to c. s. fever and the death rate was 0·02 p. m. There were 528 deaths (0·1 p. m.) in urban areas out of which an epidemic in Ahmedabad town provided 344; Poona reported 87 deaths. Eighty one cases with 63 deaths, registered in Sind, were chiefly from the Sukkur and Hyderabad jails. Only 27 deaths occurred in rural areas.

The epidemic in Ahmedabad city reached its peak in March, with 285 cases and 109 deaths. All castes were affected and the proportion of attacks among males and females was about 4 to 1. Incidence was high between the ages 20—30 years and the case mortality was 47%. Preventive measures taken included the prohibition of assemblies of more than 50 persons; the closure of schools, cinemas and theatres; disinfection of infected premises; prophylactic inoculation, etc.

Burma.—Only ten deaths were reported in towns and none in rural areas. The notification of this disease is compulsory in Rangoon and Maymyo towns only.

Vaccine.—Altogether 61,313 c. cs. of anti-meningococcus vaccine sufficient to inoculate 17,000 adults were issued from the Central Research Institute, Kasauli. The incidence of the disease among the inoculated and the uninoculated is given in Table II (lxvii).

TABLE II (lxvii).

	Number.		Cases.		Deaths.	
	Inoculated.	Uninoculated.	Inoculated.	Uninoculated.	Inoculated.	Uninoculated.
Total	**9,017**	**396,324**	**7**	**374**	**3**	**228**
Aligarh	472	1,678	..	57	..	34
Bhagalpore central jail	1,017	1,196	1	1	1	1
Fatehpur district jail	431	112	3	12	1	9
Gurgaon	52	14,000	..	28	..	14
Cawnpore	109	8,916	..	7	..	35
Benares	32	768	..	4	..	2
Agra	4,283	205,487	..	206	..	109
Multan	26	108,000	..	3	..	2
Ajmer	94	6	1	..		..
Delhi (N. W. R.)	456	2,000	..	8	..	2
Epidemiological Bureau, Punjab	1,841	17,375	2	37	1	19
Simla	204	36,786	..	11	..	2

In two fatal cases the vaccine had been given on the day on which symptoms appeared. A large number of the inoculated persons were contacts of c. s. m. cases and many were in personal attendance on such cases. Secondary cases in the same household were notably uncommon. It cannot be said that the figures available prove anything. Severe reactions were uncommon but mild or moderate local and general reactions were experienced in most cases, these being local pain and tenderness with headache and fever.

Trachoma and other eye diseases.

43. Captain P. Shannon*, I.M.S., specialist in ophthalmology for the Baluchistan district, has studied the incidence of trachoma in Baluchistan and elsewhere in India. The conclusions to be drawn from his work are summarised below :—

1. Trachoma in India is practically limited to the indigenous population.

2. Incidence varies greatly in different districts being highest in the Punjab and lowest in southern India.

3. The disease occurs among the different classes of the same community in a fairly constant ratio.

4. Of the various religions and castes, Sikhs, in whom the incidence is at least 75%, are those mainly affected, while southern India Hindus are practically free.

5. Most of the cases met with in the Indian Army are old, the disease having begun in early life and a large proportion being healed before reaching adult life.

6. The scheme of enlisting recruits suffering from trachoma—which differs from the policy in the armies of other trachoma-endemic countries—is safe and justified, and is unlikely to cause any serious spread to healthy troops on account of (*a*) the better hygienic life of the sepoys in comparison with the overcrowding, etc., of Indian village life, (*b*) the rigid caste system which prevails in Army life even when men of different communities are brought together in barrack life, and (*c*) most of the trachoma being healed or almost healed before enlistment.

*Indian Medical Gazette, Vol. LXIX, page 672.

7. As in Egypt, most of the infections occur in the homes of the agricultural classes among young children even before school life.

8. Fresh cases in adults are similarly derived from their infected families, especially during epidemics of Koch-Weeks ophthalmia.

9. A treatment measure, such as Salisberry's sodium chloride massage which is cheap, simple, quickly effective and safe in application, is required if the disease is to be effectively treated by any other than a few ophthalmic experts.

10. A national anti-trachoma scheme is necessary, involving wide propaganda on the nature and results of the disease amongst —

(*a*) Indian practitioners who practise European methods in this country,.

(*b*) school teachers and educated social workers, and

(*c*) the agricultural classes themselves, especially the womenfolk, by means of the two channels above mentioned.

Such a scheme should enlist the co-operation of (*a*) existing research institutions wherein animal and human experiments could be carried out to improve our present knowledge, (*b*) large military and civil hospitals and institutions where new treatments could be investigated, (*c*) medical colleges and universities where the rank and file might be taught the manifestations of the disease in a practical form to enable them to distinguish the disease and practise its prevention and treatment with safety, and (*d*) village and *bazar* doctors, who alone can carry the treatment campaign to the masses of the people, in the form of some simple standard treatment of sufficient prophylactic and curative value, while serious or complicated cases could be treated under the supervision of a district trachoma authority, or operated on in one of the district centres.

11. If in the beginning such a scheme were confined to the most heavily infected province and limited to children as a child welfare scheme, it would serve as an introduction.

Punjab.—Altogether 1,127,870 cases attended hospitals and dispensaries for the treatment of trachoma. The distribution of the cases by districts is given in Table II (lxviii). Operations for the extraction of lens numbered 28,411.

TABLE II (lxviii).

Hissar	18,696	Gujranwala	26,850
Rohtak	29,598	Sheikhupura	50,367
Gurgaon	24,090	Gujrat	39,460
Karnal	36,432	Shahpur	56,814
Ambala	28,970	Jhelum	14,954
Simla	163	Rawalpindi	12,738
Kangra	19,634	Attock	19,710
Hoshiarpur	258	Mianwali	54,849
Jullundur	15,029	Montgomery	77,291
Ludhiana	53,529	Lyallpur	62,531
Ferozepore	77,513	Jhang	52,509
Lahore	57,998	Multan	53,537
Amritsar	57,725	Muzaffargarh	30,787
Gurdaspur	49,841	D. G. Khan	24,928
Sialkot	69,895		

Cases treated in hospitals and dispensaries in the U. P. numbered 257,949 and in C. P. 28,081.

Delhi Province.—Eye diseases, including trachoma, are very prevalent. Table II (lxix) gives the *cases* treated in hospitals and dispensaries during 1933 and 1934.

TABLE II (lxix).

	1933.	1934.
Trachoma	19,656	16,554
Eye diseases	108,660	84,679
Percentage of trachoma cases to total eye diseases	18	20
Percentage of eye diseases to "all causes"	10	9

A survey of the rural areas in December, 1934, showed 3-4 blind persons per 1,000 of population, most cases being among agriculturists. The principal causes are given in Table II (lxx).

TABLE II (lxx).

	Hindus.		Muhammadans.		Christians.		Total.	
	M.	F.	M.	F.	M.	F.	M.	F.
Total .	**293**	**260**	**77**	**55**	..	..	**370**	**315**
Congenital . .	21	14	4	2	..	..	25	16
Cataract . .	32	27	9	7	..	..	41	34
Glaucoma . .	3	2	..	1	..	..	3	3
Injuries . .	25	17	8	9	..	..	33	26
Old age . .	80	83	19	9	..	..	99	92
Other eye diseases.	41	32	12	11	..	..	53	43
Small-pox . .	38	30	12	7	..	..	50	37
Syphilis . .	..	..	..	..	..	..	..	..
Trachoma . .	53	55	13	9	..	..	66	64

B. & O.—Diseases of the eye are very common, especially in Bihar proper. Altogether 431,160 patients were treated, operations for extraction of lens numbering 3,124, against 3,916 in 1933.

Lead Poisoning.

44. *Burma.*—Five cases of lead poisoning among employees of the Burma Corporation, Ltd., Namtu, were treated, of these 4 improved and one was discharged with compensation.

SECTION III.

MATERNITY AND CHILD WELFARE.

General.

45. Development of maternity and child welfare work along modern lines began in 1918. The early workers in the field were for the most part the voluntary workers and associations. These worked with zeal and enthusiasm and accomplished much; they tried out schemes of widely varying types, accumulated experience and prepared the way for a more permanent type of service by demonstrating at once the usefulness and the limitations of the schemes they inaugurated.

The limitations are those imposed by lack of expert advice and technical guidance, by lack of contacts with other public health and social services, and by confinement to small and segregated communities, too poor financially to employ an adequate and well trained staff or to maintain a complete scheme providing continuity in observation and care from conception to adolescence. Even where small self-contained schemes are economically possible, it is inexpedient to allow them to continue unrelated to other welfare services. Expert organisation, planning on a wide basis and co-ordination of work, are essential for progress, and the co-ordinating and unifying agency should be the public health department of provinces and large cities.

Public attention is focussing more and more upon the continuing high rates of infantile and maternal mortality. Schemes for control are being pressed on local bodies and evidence is not lacking that the Public Health Departments, notably in Madras, Burma and the Punjab, are alive to their responsibilities.

In view of this increasing interest in the subject, the year 1934 seemed propitious for a review of the maternity and child welfare situation, and a special report form was drawn up and circulated to all Directors of Public Health. The information collected from the completed form is summarised in subsequent sections of this chapter.

Unfortunately the completeness of the returns varied greatly in the different provinces. The form of report was new and information related to a year already gone, so that accuracy and detail in the replies was hardly to be expected. Few provinces were able to collect accurate information on the number of maternity beds available or the distribution of the beds in civil, military, mission or private hospitals and homes. The numbers of trained *dais* and midwives recorded as practising in the provinces is also inaccurate, yet sound planning is impossible in the absence of such fundamental data and the first step towards placing maternity and child welfare on a sound basis is a survey in each province of the facilities existing for the care of the mother and child. Now that a beginning has been made it is expected that this survey will be generally undertaken and more accurate and complete information will become available in subsequent reports.

Vital Statistics.

46. Table III (*i*) shows the recorded provincial rates for maternal mortality. Figures for B. & O. and Punjab are not available.

The notes for this section have been supplied this year by Dr. Jean M. Orkney, W.M.S., Director, Maternity and Child Welfare Bureau, Indian Red Cross Society.

TABLE III (*i*).

	Urban.	Rural.
N.-W. F. P.	11·0§	..
Delhi	7·0	2·2
United Provinces	9·6	0·5
Bengal	9·0	9·4
Central Provinces	11·7	6·2
Bombay	9·1	5·1
Assam	15·1*	..
Burma	10·5	3·6
Madras	13·4	7·7

* For 13 towns. § (Peshawar town only.)

The method of calculating the maternal mortality rate is uniform, but the usual practice is to base it on the number of registered births, which excludes still-births. Fallacies are thus introduced which limit the value of the figures for comparison with the rates of countries adopting live births or live and still-births, as a basis of calculation. It is considered that in future the maternal mortality rate should be calculated on live and still-births.

Probably the most accurate estimate of maternal mortality done in India hitherto is that of Dr. Mudaliar's in Madras city. He gives a rate of 16·6, but himself considers this is on the low side. As it is, this is the highest rate recorded for any large city in India.

In Table III (*i*) the maternal death rate in urban areas is almost everywhere shown as greater than that of rural areas. The advantage may possibly be in favour of rural India but it is certainly not so overwhelming as suggested by the figures recorded. In rural health units experience has been that the inauguration of a skilled midwifery service has rapidly effected a remarkable reduction in maternal mortality and morbidity. In certain towns, on the other hand, hospitalisation of confinements has done little to reduce maternal mortality. In Bombay, in 1931, 62·09 % of births took place in maternity homes and the maternal mortality rate is given as 7·2 per 1,000 births. In 1933 the rate was 7·5 with 70·6 % hospitalisation and in 1934 the figures were 6·9 and 68·3 per cent.

Apart from differences in health and environment more accurate classification in towns is a factor of much importance in explaining the discrepancy between rural and urban rates.

While many of the larger municipalities make arrangements to verify the cause of death by medical inquiry, the results cannot always be regarded as reliable. In rural areas it is frankly stated in the reports that verification is impossible since no agency exists capable of carrying it out.

In the circumstances only a few towns adopt the international classification of causes of maternal deaths, most are content with the broad classification, sepsis and non-sepsis.

The Public Health Commissioner is indebted to Dr. Ruth Young, M.B.E., W.M.S., for drafting the questionnaire.

The most accurate presentation of facts relating to the causes of maternal death in a general urban population is found in Dr. Mudaliar's "Report of an investigation into the causes of maternal mortality in Madras city" published in 1933. For a special population, the analysis of returns submitted by women's hospitals in India, published in the Journal of the Association of Medical Women, is worth quoting. These figures, together with figures for England and Wales taken from the Final Report of the Departmental Committee on Maternal Mortality and Morbidity published are given in Table III (*ii*).

TABLE III (*ii*).

Cause of death.	Per cent. of total.		
	England and Wales.	Madras Town. (Mudaliar 1931-32.)	Women's Hospitals, 1934.
Sepsis	29·7	29·6	22·3
Eclampsia	9·2	8·7	9·7
Operative shock	8·0	—	11·5
Ante-partum hæmorrhage	6·4	3·7	7·5
Post-partum hæmorrhage	5·0	9·0	
Other toxaemias	4·8	1·2	2·8
Embolism	5·4	1·8	0·9
Abortion	9·9	5·1	—
Extra uterina pregnancy	1·2	0·5	—
Associated diseases	19·8	23·4	16·3
Accidents of labour	—	5·7	9·1
Anaemia	—	11·5	19·9

Sepsis accounts for practically the same proportion of deaths in England and Wales and in India. In the non-septic causes the variation is marked. Anaemia of pregnancy, which does not appear as a cause of death in England and Wales, assumes an importance in India, second only to sepsis. The diarrhœa and dysentery group among associated diseases are of greater moment in India, and since they cause many disasters they focus attention on the need for ante-natal treatment and care.

Finance.

47. The proportion of the provincial resources allocated for maternity and child welfare varies from *nil* in Assam and Bombay to 9·3% of the public health budget in the Central Provinces. The largest sum of money allotted by a local Government is Rs. 1,20,000 in the United Provinces, while the greatest proportional allotment from a Public Health Department's budget is that of the Central Provinces.

In the Central Provinces and the United Provinces, where most is being spent, large sums from the provincial budgets are handed over to voluntary societies for expenditure. In Bihar and Orissa the situation is somewhat similar, while in Burma the Red Cross advises on the distribution of the Government grants. This policy has been of value where organisations, such as the provincial branches of the Indian Red Cross Society, are well developed and organised for maternity and child welfare work.

Official Public Health Departments are however making progress in organisation, and the time has perhaps come in some provinces for a reconsideration of the policy of reliance on voluntary associations for work which should be an integral and vital part of the public health service. A transition

period between voluntary and official control may be desirable, uniting as it does official backing and expert knowledge to the driving force of the enthusiastic voluntary worker, as in Burma and Madras which maintain cordial relationship and mutual co-operation between the Public Health Department and the Indian Red Cross Society, while retaining the ultimate control and direction in the hands of the Director of Public Health. In the Punjab and Madras a maternity and child welfare service is being organised directly under the Public Health Department, with this difference that the Punjab Government has assumed full financial responsibility for the health school, whereas in Madras the training of health visitors is still a Red Cross activity.

Madras Presidency spends the whole allotment from the public health budget at headquarters on salaries and establishment charges of personnel on the staff of the Director of Public Health, but most provinces find it desirable to make grants-in-aid of local schemes generally in the form of a contribution towards the salary of a trained worker. Even in Madras, the need for grants to centres has been felt and the Director of Public Health expresses an opinion in favour of Government financial support for local schemes.

The supply of well qualified doctors and health visitors is still limited, salaries are consequently high and beyond the resources of local bodies, and unless government grants are sanctioned the tendency is for municipalities and district boards to employ untrained and poorly educated workers who, being without vision and unable to appreciate their key position in the public health structure, wreck the best laid plan and bring welfare work into disrepute.

Burma and the Punjab not only aid in the training of health visitors for local work but also subsidise local bodies or societies employing a qualified staff, thus securing work of a high standard in aided centres.

Training and employment of Health Visitors.

48. The *health visitor* is the most important single unit in the maternity and child welfare services. On her personality, knowledge and skill the success or failure of child welfare turns and her *training* is therefore a matter of the utmost importance. In 1934 there were five health schools in India. The Punjab and Central Provinces Health Schools are wholly maintained by the provincial Governments. The schools in Delhi and Madras are financed by the Indian Red Cross Society with grants-in-aid from Government sources. The Poona Health School is sponsored by the Seva Sadan Society and receives a grant from the Maternity and Child Welfare Bureau, Indian Red Cross Society. Health schools in Bombay and Rangoon were in process of organisation during the year.

Of the major provinces, Bengal and the United Provinces have no course of training for public health nurses. The U. P. has a scheme ready to launch, but in Bengal the Red Cross Health Visitors School maintained for several years was closed in 1933 owing to lack of demand for health visitors and insufficient finance, a most unfortunate retrograde step.

The smaller provinces may desire a local health school and that is the ideal arrangement, but financial stringency may necessitate their sending stipendiary pupils to one or other of the well established health schools.

Each school admits from 8 to 12 students per year, an inadequate number in view of the need, but almost sufficient to meet the present poor demand for trained workers.

Clauses providing for regulation of the training of health visitors and for conditions of admission to the registers are incorporated in most of the recent Nurses, Midwives and Health Visitors Registration Acts, but few of the health schools have yet come under the influence of the Nursing Councils

provided in the Acts. The curriculum of training for the English course is very similar in all schools, being standardised at present mainly through the agency of the Maternity and Child Welfare Bureau of the Indian Red Cross Society. As schools become provincialised, greater individuality will tend to appear and standards may vary widely unless close co-operation is maintained between the various nursing councils responsible for inspection and recognition of the course of instruction. Reciprocal recognition of health visitors' certificates is very desirable, and just as medical education throughout India is controlled by one central medical council so also will it doubtless be found advisable to have central control in maintaining uniform and high standards of training in health schools.

The number of *welfare centres* in England and Wales in 1934 was 2,884. The number in India is 684, the number and the distribution by provinces being shown in Table B on page 318 of this report. The United Provinces heads the list with 166 centres, excluding 13 sub-centres, but many of these are in charge of poorly trained or untrained welfare workers. Educational work, which is the primary purpose of welfare centres, plays but a minor rôle in the activities of these centres and a more accurate description would be midwifery centres. In Madras and the Punjab the employment of untrained health visitors is prohibited. The establishment of 153 welfare centres therefore, all apparently engaged in preventing disease and in spreading health propaganda, is worthy of achievement. Burma, although late in the field, has made good progress and the centres, though relatively few in number, are working on sound lines.

Industrial welfare work in tea gardens, in jute mills and on railways is more extensive than is represented in the reports submitted for 1934, and comment is reserved until more accurate returns on this aspect of child welfare are available.

There is no medical woman employed by the Government of India to advise on maternity and child welfare work, while among the provinces only Madras has a medical woman assistant to the Director of Public Health.

The advantage of woman medical officers in this special branch of work is obvious and the time would appear to have arrived when the Government of India and the provinces should employ qualified women doctors to inspect and advise on maternity and child welfare work.

Training of Indian lady doctors in this special branch of preventive medicine has hitherto been a difficulty, but hope for the future lies in the establishment of a course for the Diploma in Maternity and Child Welfare (D. M. C. W.) at the All-India Institute of Hygiene and Public Health, Calcutta. The first course was completed during 1934 and two students passed out with a sound background of preventive and constructive medicine and a knowledge of administrative methods on which to superimpose experience in actual practice.

Now that facilities for training exist, it is to be hoped that employing authorities will give preference to candidates who have specialist qualifications and will also grant study leave to doctors already employed in welfare schemes.

Compared with 590 health centres, the number of health visitors employed in India is recorded as 206, only 5 of these being in Government service. A good service of qualified health visitors is a fundamental factor in all maternity and child welfare schemes, and *municipalities* and local bodies contemplating the establishment of infant welfare centres are well advised to defer the opening rather than to start with unqualified workers who will at worst bring the scheme into disrepute and at best model the work on curative line

The Midwifery Services.

49. Judged on a basis of one bed per 100 births and one midwife for 150 births, the provision of facilities for maternity cases in Indian provinces is undoubtedly inadequate. Accurate figures of the numbers of beds available for confinements are not available partly because so many general hospitals admit confinement cases. The total number of special beds recorded is 3,162 but this is an underestimate, some provinces having reported the numbers as "unknown".

The number of trained midwives in India, as recorded by Directors of Public Health, is shown in Table B on page 318.

Control and inspection of the work of qualified midwives varies greatly, from no inspection at all to detailed control by officers of the Medical and Public Health Departments and voluntary societies.

More important than the present position is the way in which provinces are preparing to meet the needs of the community in the future. Legislation designed to improve the standard of training, to regulate the issue of certificates, to establish and maintain registers and to supervise the practice of midwives has been passed recently in six out of eleven provinces. Unfortunately at least one provincial Government professes difficulty in meeting even the small sum required for the salary of the registrar and secretary to its nursing council.

The number of hospitals in which the standard of training is sufficiently high to warrant recognition as schools for midwives and the number of midwives qualifying yearly are insufficient. Midwifery in the scattered villages and hamlets must remain in the hands of the indigenous *dais* in the northern provinces at least, during the next two decades, and there is need in most provinces for a definite policy in regard to the training, registration and control of the *dai*. The Punjab is an outstanding exception; there the training of *dais* is being vigorously prosecuted and trained *dais* are being registered under the Punjab Nurses and Midwives Act, 1932. This Act contains clauses prohibiting untrained practice, which can be enforced by the local authority or failing it by the provincial Government, whenever the local situation warrants this step. It is not without significance that the number of *dais* attending instruction classes has increased greatly in the past few years.

One hopeful sign pointing to dissatisfaction with the existing order is that the older method of instructing of *dais* by public health officers, sub-assistant surgeons and midwives is being gradually replaced by the establishment of training schools run in conjunction with a maternity hospital or home and having an infant welfare centre attached. This system is ideal because it affords the *dai* opportunity of acquiring experience in ante-natal work and in domiciliary as well as institutional methods of midwifery. Few *dais* have the capacity of envisaging a method they have not seen, or of adapting hospital methods in the poor home. In the *dais* training school, the teacher is a health visitor or medical woman, teaching equipment is better and practical work of a higher standard.

Public examinations in midwifery are held in all provinces except Assam. In Delhi and the N.-W. F. P. the examining body is the Punjab Central Midwives Board. For the poorer and smaller provinces some such arrangement is preferable to the constitution of a separate board or council to inspect and recognise hospitals as training schools and to conduct examinations and issue certificates, since it makes for uniformity of standards and wider reciprocal recognition of certificates.

Emphasis has been laid on training of *dais* and midwives because this is the first step towards ensuring that skilled service is available for all confinements. Experience has proved the value of even a little training in cleanliness and non-interference and in ante-natal care in effecting reduction in the maternal mortality rate.

The provision of *maternity beds* for cases of complicated pregnancy and labour and for patients with unsuitable home conditions is a further step which will follow almost automatically the establishment of skilled domiciliary midwifery. The demand for maternity homes for the middle classes is very insistent, and municipalities particularly are being pressed to provide and maintain such institutions from the rates. In Bombay hospitalisation has reached the enormous proportion of over 70% of confinements. This policy is questionable. Maternity hospitals and homes are more expensive to equip, to staff and to run than an efficient domiciliary midwife service conducted from a maternity hospital or run in conjunction with a maternity and child welfare scheme, and there is no conclusive evidence that they provide for safer confinement.

The normal confinement can safely take place at home provided the surroundings are suitable, and municipalities may well pause and consider before they commit themselves to the building and staffing of expensive homes which will be used largely by a class who can afford to pay for the services of a doctor or midwife, while giving secondary place in the maternity services programme to a municipal domiciliary midwife service reaching all classes of the community.

On one point only is there unanimity in reports received. Everywhere the position with regard to midwifery is said to be improving, in some provinces progress is rapid and a definite policy is being followed, but in others improvement is slow, unco-ordinated and irregular.

In conclusion, it may be said that the outstanding need of the maternity and child welfare services in India to-day is expert medical control, developing, co-ordinating and directing all effort, voluntary and official, towards the one common goal of robust individual health and racial improvement. This need can best be met by appointing a special Assistant Director for Maternity and Child Welfare in each province and by establishing a central official controlling body to advise on and direct policy.

SECTION IV.

PUBLIC HEALTH ADMINISTRATION.

Administration.

General.

50. The total expenditure of the Central Government on public health during the year 1934-35 is included in Table IV(*i*).

TABLE IV(*i*).

	India general.	Baluchistan.	Other areas.	Total.
	Rs.	Rs.	Rs.	Rs.
Total .	**9,67,405**	**14,595**	**4,57,504**	**14,39,504**
Public health establishment .	3,82,592	10,595	10,873	4,04,060
Grants for public health purposes	2,24,757	4,000	2,00,000	4,28,757
Epidemic diseases . . .	43,784	..	2,45,787	2,89,571
Bacteriological laboratories .	1,99,978	..	..	1,99,978
Pasteur institutes . . .	1,707	..	..	1,707
Works	1,14,587	..	844	1,15,431

The figures of expenditure by the provincial Governments on these public health activities during 1934-35 are given in Table IV (*ii*).

TABLE IV (*ii*).

	Total.	Public Health establishment.	Grants for public health purposes.	Epidemic diseases.	Bacteriological laboratory.	Pasteur Institute.	Works.
	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
Total .	**1,45,23,522**	**60,18,329**	**45,46,036**	**17,43,167**	**8,12,640**	**3,40,695**	**10,62,655**
N. W. F. P.	1,31,900	75,944	39,133	15,104	...	1,719	...
Punjab .	10,29,391	5,95,430	2,38,241	1,56,026	17,359	22,335	...
U. P. .	20,44,069	13,69,484	4,84,686	1,30,535	...	...	59,364
B. & O. .	9,96,146	4,14,820	2,16,925	1,57,547	31,115	15,371	1,60,368
Bengal .	36,01,241	7,11,824	24,83,334	2,74,463	87,377	39,212	5,031
C. P. . .	3,51,303	85,919	44,788	2,16,734	3,862	...	...
Bombay .	26,05,753	10,48,129	2,59,058	1,61,403	2,90,748	30,887	8,15,528
Madras .	21,71,697	12,09,850	4,50,155	1,14,222	3,59,078	35,322	3,070
Coorg .	7,224	2,504	...	4,720	...	...	...
Assam .	6,68,812	1,54,422	10,743	3,48,285	12,063	1,25,943	17,356
Burma .	8,79,087	3,13,185	3,18,973	1,64,047	11,038	69,906	1,938
Shan States Federation	36,899	36,818	...	81	...	...	...

North-West Frontier Province.

The I. G. C. H., is *ex-officio* D. P. H. and has two Assistant Directors, one of whom held additional charge of the provincial public health laboratory, Peshawar, while the other is employed chiefly on rural work.

Abbreviations :—

D. P. H. . . .	Director of Public Health.
A. D. P. H. . . .	Assistant Director of Public Health.
M. O. H. . . .	Medical Officer of Health.
M. O. S. . . .	Medical Officer of Schools.
I. G. C. H. . . .	Inspector General of Civil Hospitals.
L. C. P. S. . . .	Licentiate of the College of Physicians and Surgeons
U. P.	United Provinces of Agra and Oudh.
C. P.	Central Provinces.
B. & O.	Bihar and Orissa.

Punjab.

The D. P. H. had four Assistant Directors, one in charge of vaccination and the other three in charge of Rawalpindi, Ambala and Lahore divisions. An epidemiologist was also employed. The sanctioned strength of the provincial cadre of district M. O. Hs. remained unchanged at 28 but owing to shortage of officers the M. O. Hs. of Rawalpindi and Gurdaspur districts held additional charge during the summer as municipal M. O. Hs. of Murree and Dalhousie. The subordinate provincial staff employed under district M. O. Hs. consisted of 28 sanitary inspectors *plus* an epidemic staff of 10 sub-assistant health officers and 15 sanitary inspectors. Only 13 municipalities employed whole time M. O. Hs., whilst the dispensary medical officers, civil surgeons and private medical practitioners acted as part time M. O. Hs. in 28, 6 and 5 municipal towns, respectively, and in three others the district M. O. Hs. supervised the public health arrangements.

The work of the epidemiological bureau mainly consisted of laboratory or field work in connection with malaria surveys and forecast, spleen census, epidemic malaria, other epidemic investigations, examination of water supplies, hookworm campaign, Phalgu fair, Karnal, propaganda, educational work, etc.

Disinfectants, vaccines, etc., were kept in stock at the public health equipment depot, Jullundur.

Delhi.

The Public Health Commissioner with the Government of India is D. P. H. and has a full time A. D. P. H. who also acts as M. O. H. of New Delhi and the Notified Area, while Old Delhi has its own whole time M. O. H., employed by the Municipality. In small towns the dispensary sub-assistant surgeon acts as part time M. O. H. In rural areas, the district board advised by the A. D. P. H. is responsible for the enforcement of suitable health measures. Byelaws, applicable to rural districts were framed and issued in 1927 under the Punjab District Board's Act, 1883 ; these relate to the disposal of refuse ; manure and night-soil ; control of wells for drinking purposes ; collection and steeping of hemp ; excavation of pits ; disposal of dead bodies and skinning and tanning processes.

United Provinces of Agra and Oudh.

The total allotment for the Public Health Department, including the Engineering Branch and the Board of Public Health, was Rs. 19,84,785 as against Rs. 19,46,392 in 1933-34. Out of this sum, the budget of the D. P. H. amounted to Rs. 14,55,059.

During the year, the U. P. Nurses, Midwives, Assistant Midwives and Health Visitors Registration Act (No. XV of 1934) was passed and amendments affecting public health were made in the following Acts :—

(*i*) The U. P. Town Areas (2nd Amendment) Act (II of 1934) ; (*ii*) the U. P. Municipalities (2nd Amendment) Act (No. XVIII of 1934) ; (*iii*) and (*iv*) The U. P. Village Panchayat (Amendment) Acts (Nos. V and XIX of 1934).

Two Assistant Directors assisted the D. P. H. in general inspection duty each in his range ; a third held charge of the hygiene publicity bureau and the school health service ; while a fourth directed the malariology and epidemiology bureaux. The administration of the provincial hygiene institute remained in charge of the senior lecturer.

Out of 48 districts in the province the district health scheme was in force in 30. The number of qualified M. O. Hs. and assistant M. O. Hs. was 71

including a leave and epidemic reserve of 10. Full time urban M. O. Hs. were 33 while in 27 municipalities and 36 notified areas, the District M. O. Hs. supervised the public health arrangements.

The public health improvement scheme at work in rural areas included (*a*) the village aid scheme ; (*b*) appointment of resident public health officials for groups of villages, (*c*) the health unit, Partabgarh ; and (*d*) rural reconstruction work.

The village aid scheme consists chiefly in providing " Village aid dispensaries ", the training of " Village aiders " and in carrying out general sanitary improvements. The scheme was fully in force in 1,808 villages and partly in 5,036 ; the dispensaries numbered 3,378, these being aided by " panchayat " boards while the provincial branch of the Indian Red Cross Society provided funds for the initial equipment of many.

The scheme of appointing resident public health staff was as before in force in Gorakhpur district only, the cost being met by the district board.

The health unit, Partabgarh, was described in last year's report (pages 112-113). It was continued in co-operation with the Rockefeller Foundation and the provincial branch of the Indian Red Cross Society.

With funds provided by the Government of India and the local Government, a scheme of rural development in selected villages was formulated with a view to concentrate the efforts of the various interested Departments on improving the physical and material condition of the villagers.

The provincial hygiene institute continued its usual work. In addition to laboratory work, it manufactured 299,525 doses of cholera vaccine and provided public health training for the M. B. B. S. degree in hygiene, the L. P. H. (parts I and II) ; and for sanitary inspectors. Post-graduate courses were given to M. O. Hs. embracing malariology, hygiene publicity, maternity and child welfare, public health chemistry and bacteriology, hygiene, sanitary law, etc.

Bihar and Orissa.

The total public health allotment during 1933-34 amounted to Rs. 3,74,046 ; important items of expenditure being Rs. 44,283 for school medical examination and the teaching of hygiene in high schools ; Rs. 1,23,974 for epidemics ; Rs. 1,747 for publicity work ; Rs. 16,196 for public health laboratory and Rs. 1,84,884 for public health establishment.

Besides the D. P. H., three A. D. P. Hs. were at work, each in charge of a circle ; these investigated epidemics ; supervised prophylactic measures, *e.g.*, vaccination, cholera and plague inoculations ; inspected and reported on nuisances ; inspected district boards, municipalities, union boards, schools and fairs ; and carried out health propaganda. Their expert advice is reported to have led to sanitary improvements in many directions, notably in drainage, water supply, and disposal of refuse and excreta. In addition to a woman there are 5 M. O. Ss. of the assistant surgeon grade and 5 of the sub-assistant surgeon grade. Besides 100 vaccinators trained in disinfection work, a temporary staff of sub-assistant surgeons was maintained to assist in controlling serious epidemics in the districts.

Twelve of the 21 districts employed fully qualified M. O. Hs. with the requisite subordinate health staffs ; in some districts assistant health officers (L. M. Ps.) were also employed at subdivisional headquarters. Only two district boards met the whole cost of their M. O. Hs. ; in 6 districts, the local Government paid the entire cost, while Government contributions were given to 4 other districts. The remaining districts maintained only small health

staffs, and for epidemics, either recruited additional staff or obtained the loan of Government doctors. The expenditure on sanitation incurred by these boards amounted to Rs. 5,05,104 or about 3% of income.

Of the 58 municipalities, 8 had full time M. O. Hs. In Gaya, Patna, Puri, Ranchi and Cuttack, the M. O. Hs. were paid by Government; the remaining 3 being paid from municipal funds.

Municipal expenditure on sanitation totalled Rs. 17,21,674 or 31% of the total revenue.

The public health bureau and the laboratory continued their usual work.

Bengal.

The superior health personnel consisted of one D. P. H. and 4 A. D. P. Hs. who were in charge of the 4 circles.

A district health scheme was at work in 25 districts. All the 575 rural health circles in the districts, Darjeeling excluded, had trained sanitary inspectors, some having also assistant health officers. The expenditure on communications was Rs. 33,98,642 or 17 %, water supply Rs. 5,96,753 or 3 %, buildings Rs. 3,79,840 or 2 %, sanitation Rs. 17,50,777 or 9 %, vaccination Rs. 2,37,334 or 1 % and drainage Rs. 29,649 or 0·1 %. The administration of 4,740 union boards was carried out under the Village Self-Government Act. These bodies spent Rs. 6,24,675 or 7 % of income on roads, Rs. 5,87,857 or 7 % on water supply, Rs. 68,186 or 1 % on drainage, Rs. 67,196 or 1 % on conservancy and Rs. 1,62,139 or 2 % on dispensaries.

Excluding Calcutta, 21 M. O. Hs. and 99 sanitary inspectors were employed in municipalities. It was proposed to extend new Bengal Municipal Act (XV of 1932) to Darjeeling district. Total expenditure on sanitary works was Rs. 51,86,429 or 45 % of income.

The Bengal Public Health Laboratory and the branch laboratory at Dacca, and the Darjeeling Municipal laboratory examined samples of water, sewage effluents and foodstuffs. The Bengal excise and vaccine laboratories also carried out useful work.

Central Provinces and Berar.

The anomaly of the I. G. C. H., holding combined charge of the Medical and Public Health Departments, was rectified with the appointment in October, 1934, of a D. P. H. There is no A. D. P. H., nor are there any full time District Health Officers. In addition to the 16 civil surgeons who act as part time M. O. Hs. for the 19 districts, the rural staffs comprised two publicity officers, a leprosy specialist, 17 specially trained assistant medical officers for anti-leprosy work, 35 epidemic assistant medical officers, 232 part time dispensary assistant medical officers, 6 sub-divisional medical officers and 5 assistants to civil surgeons, who also attended to public health work. The district authorities employed 37 assistant superintendents of vaccination and 256 vaccinators.

The Village Sanitation and Public Management Act was in operation in 79 villages. Rural uplift work was continued in the districts of Saugor, Hoshangabad and Nimar.

In municipalities qualified M. O. Hs. continue to be employed in Nagpur, Jubbulpore and Amraoti only; elsewhere trained sanitary inspectors were in-charge of sanitation, except in the Balaghat district where no sanitary inspector was employed in any town.

The Public Health Institute, Nagpur, continued to function as the provincial bacteriological and chemical laboratory.

Bombay Presidency.

The Public Health Department cadre comprises one D. P. H., 4 A. D. P. Hs., the Director of the vaccine institute, Belgaum, and two officers in charge of the public health laboratories at Poona and Karachi. The A. D. P. Hs., in addition to their public health duties, control vaccination work. The subordinate staff includes 31 inspectors of sanitation and 420 vaccinators.

In Bombay city there are a M. O. H. and 5 assistant M. O. Hs., 38 other health officers and 16 sanitary inspectors. In other municipalities and towns there were at work 23 M. O. Hs. and assistant M. O. Hs. and 113 sanitary inspectors and in rural districts four M. O. Hs.—one each in Belgaum, Dharwar, Satara and Larkana.

The total budget allotment under the control of the D. P. H. aggregated to Rs. 8,63,756.

Sixty-two candidates passed the sanitary inspector's examination and were awarded certificates from the Royal Sanitary Institute, London.

Madras Presidency.

The cadre of the Public Health Department consists of one D. P. H., 5 A. D. P. Hs. including one woman Assistant Director, 58 first class health officers, 51 second class health officers, 286 health inspectors, 42 Government vaccinators and 879 other vaccinators employed by local bodies, one entomological assistant and 2 compounders. Forty-five M. O. Hs. worked in districts and 53 in urban areas.

The malaria officer attended a malaria training class at Singapore under the auspices of the League of Nations ; another health officer trained in malaria at Karnal. Two posts of reserve second class health officers, one temporary post of entomological assistant to the malaria officer and one temporary post of health inspector were sanctioned for *anti*-malarial work in Anantapur district. The term of the temporary staff of 6 assistant district health officers, two units for *anti*-hookworm campaign and two health inspectors for *anti*-malarial work in Vizagapatam Agency was extended for one year. The District Municipalities and the Local Boards Acts were amended to empower the local Government to provincialise local boards employees ; consequently first class health officers employed by these bodies were included in the Madras public health cadre.

Assam.

The budget allotment for the year 1934-35 for Public Health amounted to Rs. 6,63,800 of which Rs. 5,67,624 was controlled by the D. P. H.

In addition to the D. P. H. and 2 A. D. P. Hs. there were employed 9 urban health officers, 7 assistant surgeons, 104 sub-assistant surgeons, 39 vaccination inspectors, one bio-chemist, 5 compounders, 30 disinfectant carriers, 15 laboratory assistants and media makers, 37 Government vaccinators in hill districts, 360 vaccinators employed by local bodies, 25 by municipalities and one by the development board. Only in Shillong was a fully qualified health officer employed and his pay was partially met by the local Government.

The 19 local boards spent a total of Rs. 1,41,278 on public health. Their chief public health activities were concerned with *anti*-cholera inoculation ; vaccination ; treatment of kala-azar, yaws, leprosy, malaria and minor eye complaints, quinine and cinchona distribution, etc.

Burma.

The headquarters staff consisted of one D. P. H. and two A. D. P. Hs. District M. O. Hs. were employed in Akyab, Myaungmya and Pyapon and four assistant district health officers were employed in the districts of Prome, Bassein, Magwe and Mandalay; in the remaining districts the civil surgeons were *ex-officio* district health officers. Centrally controlled but employed in the districts and in special appointments there was a cadre of 18 epidemic sub-assistant surgeons and 4 assistant district health officers.

Other rural health personnel consisted of 57 public health and 29 vaccination inspectors, 300 vaccinators, one leprosy officer and one assistant leprosy officer. Seven districts had no public health inspector and in most districts the number employed varied from 1 to 3.

At the end of 1934, 1st class whole time M. O. Hs. were employed in eight out of 9 municipalities having a population of over 25,000 and 2nd class in 6 out of 18 municipalities with a population above 10,000 and in two towns with populations below 10,000.

Urban areas employed 123 public health inspectors and 96 vaccinators. Although under section 43 of the Burma Municipal Act, every town is required to employ at least one public health inspector, the three towns of Minbya, Myitnge and Myinmu were still without them.

The Hlegu Health Unit.—The D. P. H. summarises the progress made since its inception in 1930 in the following words :—

> " The Health Unit, Hlegu, in its fifth year of existence, had a very satisfactory record of work. Each year since the unit was started in 1930 has witnessed the introduction of some additional type of activity and improvement and the standard of public health administration which has now been reached in the Hlegu township is a satisfactory one. The early period of scepticism and doubt on the part of the inhabitants has been left behind, and the unit is now firmly established, conferring real benefit on the people whom it serves and standing for the rest of the province as an example of progressive rural health work carried out on sound lines."

The Harcourt Butler Institute of Public Health.—Four private practitioners were trained for the License in Hygiene. The Public Health Inspectors' class was suspended as a measure of economy. The chemical and bacteriological sections functioned as usual. The plague section, in addition to the rats examination for plague infection, studied the Liverpool Danysz and Rattin viruses obtained from the Lister Institute. These were not as successful as claimed. The malaria bureau continued its investigation of malaria incidence in selected areas in the districts of Shwebo, Hanthawaddy and Insein.

In Appendix IV on pages 320-21 will be found details of health staffs employed in different provinces.

Medical Inspection of Schools and Colleges.

51. Arrangements for the medical inspection of school children are being developed in some provinces notably the Punjab, Delhi, U. P., B. and O. and Bengal; but in too many cases these are confined to inspection and diagnosis and are not followed up by effective measures for treatment. These activities are controlled by the provincial Education, Medical and Public Health Departments. Although there is apparently no lack of coordination, the absence of uniformity in the particulars supplied is conspicuous.

N.-W. F. P.

An additional A. D. P. H. was in charge of school medical inspection, which was continued in the municipalities of Peshawar, Bannu, D. I. Khan, Kohat and Abbotabad. Children numbering 42,794 were examined between July 1933 and June 1934. Out of 17,238 found with defects, 82 % were treated and 4,625 surgical operations were performed. Over 14 % were found unclean : 15 % had dental disease ; 10 % diseases of external eye ; 6 % enlarged tonsils, : 5 % enlarged spleen ; 4 % defective vision ; 3 % ear, nose or throat troubles, whilst 8 in every 1,000 children had skin disease.

Extractions of carious teeth were done in hospitals and filling and scaling by private practitioners. External eye diseases amounted to 10 % of the total in Peshawar, 11 % in Bannu, 13 % in D. I. Khan, 4 % in Abbotabad and 2 % in Kohat. The chief causes of defective vision were errors of refraction and trachoma.

Other defects included malaria, 715 cases or 2 %; anæmia 792 or 2 %, tuberculosis of lungs 12 and other tubercular disease 70. Three unprotected children were vaccinated and 622 others were revaccinated in Bannu.

School dispensaries have not been provided but a few simple medicines for minor ailments are kept in some schools. Mid-day meals were issued to three schools in Peshawar and Bannu. Lectures were given to students on first-aid, personal hygiene, prevention of diseases, formation of regular habits, etc.

Punjab.

The activities of the Public Health Department were confined to inspection of sanitation and environment of schools, while the medical inspection of school children was, as before, controlled by the Medical Department. The scheme described in this Report for 1933 continued to work but an extended scheme of school medical relief, including girls schools, was under consideration.

Delhi.

Medical inspection staff comprised one assistant surgeon supervisor, who also acted as a part time supervisor for rural areas, and one male and 2 female sub-assistant surgeons, one of the latter being part time. For rural areas the arrangements were as described in the Report for 1932. Bad location of institutions and over-crowding in urban schools particularly in Delhi city as also the common drinking glass or cup, and lavatory (flush type) arrangements were features, requiring early attention.

In the province as a whole, of the boys examined 24 % were found suffering from trachoma ; 21 % from enlarged tonsils ; 15 % from defective vision ; 10 % from gland diseases and 8 % each from malaria and diseases of teeth whilst 11 % were found unclean. Of the urban boys 27 % were trachoma infected ; 23 % had enlarged tonsils ; 16 % defective vision ; and 12 % diseases of glands. The rural girls suffered chiefly from enlarged tonsils, 12 %. Trachoma is not so serious a problem in rural areas where only 4 % of the girls and 6 % of boys examined were found infected.

Of 14,952 boys and 1,757 girls recommended for treatment in urban areas, and 1,892 boys in rural areas, only 946, 462 and 971 respectively were treated.

Of 182 girls found unprotected in urban areas only 35 were vaccinated or revaccinated. First-aid boxes were maintained in 8 district board middle schools.

United Provinces of Agra and Oudh.

The " central school dispensary " scheme, drawn up by the Hygiene Publicity Bureau in 1933, was started this year in the towns of Benares, Agra, Lucknow, Cawnpore and Allahabad. Owing to its success it is proposed to extend it to 8 other towns. A total of 6,886 children attended these dispensaries and, as indicated by treatment cards, 54 % of cases turned up for treatment in Lucknow, 95 % in Agra and 57 % in Benares. In all clinics, due attention was paid to the correction of defects of vision and teeth and on an average 200 retinoscopies were done by M. O. Ss. and 100 cases attended by honorary dentists in each centre. Laboratory examinations showed that 13 % of children in Queen's College, Benares, harboured microfilaria.

About 700 scholars were fed on milk and the use of sprouting gram was continued.

In other areas, the school boys medical association provided treatment by opening dispensaries in 7 schools in Gorakhpur. In Fyzabad, first-aid dispensaries were provided in 13 municipal schools, whilst no less than 4,000 such dispensaries were at work in the province.

Anti-meningococcal prophylactic inoculations were given to 3,721 children in Agra city where 21 cases of the fever occurred ; Anti-plague inoculations were given in Saharanpur, Cawnpore, Agra, Bareilly and Gorakhpur and anti-cholera inoculations in Lucknow, Agra, Allahabad, Benares, Bareilly and Gorakhpur.

In Benares, scholars have been classified into ages according to physical development and graduated exercises have been prescribed for the various physical age-groups.

Village school teachers from Lucknow, Moradabad and Gorakhpur were trained in rural reconstruction work at Partabgarh, Gorakhpur and Bulandshahr.

In 252 out of 464 schools 14 % of the children examined were found to have dental defects, 4 % pyorrhœa, 15 % tonsillar defects, 9 % eye diseases, 17 % defects of vision, 2 % lung diseases, 1 % enlarged spleen and 4 % skin diseases, whilst 3 % had acquired deformities and 3 % were mouth breathers. The school health officers in 14 municipalities detected defective teeth in 15 % of children, pyorrhœa in 4 %, tonsillar enlargement in 5 %, mouth breathing in 3 %, eyelid diseases in 12 %, defective vision in 7%, enlarged spleen in 2 % and skin disease in 4 %. Thirty-eight goitre cases were found in the town of Pilibhit, 149 in Bahraich, 5 in the district of Ballia, 8 in Garhwal and 82 in Gorakhpur.

Bihar and Orissa.

The school health staff remained the same as in 1933, but, owing to the earthquake, much progress in school medical inspection was not recorded. Of 2,287 boys examined 42 % had defects ; the corresponding figures for girls being 78 % out of 485 examined. The majority of these, as usual, had skin troubles, enlarged glands and carious teeth : 2·5 % of

boys suffered from common eye diseases, *e.g.*, trachoma, conjunctivitis, blepharitis and corneal opacity, 7 % had visual defects due to errors of refraction; and 3 % had heart disease. Re-examinations showed improvement in 367 boys and 94 girls.

Lantern lectures on hygiene, sanitation and common epidemic diseases were delivered to students of the Xth and XIth classes of the high English schools, attendance being compulsory.

M. O. S.'s inspected school and hostel buildings and these inspections are said to have led to improvements in sanitation, urinal and latrine arrangements and water supplies. They also inspected conditions of physical training.

The scheme for providing a mid-day meal at Re. 0-6-0 per student per month was introduced in Purulia.

Bengal.

The 41 medical officers examined a total of 17,602 children in 161 schools. Three full-time school medical officers examined 5,160 scholars in 30 institutions in Calcutta, whilst other medical officers examined less than 1,000 children each. Out of 17,602 scholars examined, 19 % were ill-nourished; 13 % were badly clothed; 31 % were bare footed; 6 % had skin diseases; 12 % defective teeth; 3 % nasal disease; 11 % enlarged tonsils; 2 % adenoids; 4 % enlarged lymphatic glands; 2 % lung disease; 16 % eye disease; 2 % infectious disease; while 1 % were dumb.

In height and weight the pupils compared unfavourably with recognised anthropometric standards.

Of 161 schools examined, 18 were found to have insufficient floor space, 9 insufficient lighting, 7 had neither privies nor urinals and 7 were without a playground.

In 4,865 schools in 25 districts 147,599 pupils were examined by rural sanitary inspectors. Of these 14,133 were unvaccinated and 41,776 had enlarged spleens.

Central Provinces and Berar.

School medical inspection was carried out by the urban dispensary medical officers who inspected on an average 82,847 boys and 16,096 girls each month. Of these 0·3 % children were found unvaccinated, 1 % with enlarged spleen and 2·3 % suffered from contagious or other diseases. The epidemic dispensary staff inspected on an average 103,831 students per month.

Bombay Presidency.

The Presidency is still without a scheme for the medical inspection of school children, but 131 schools were visited in Sind by the inspectors of sanitation and vaccination to ascertain the vaccinal condition of school children. Sanitation, ventilation and water supply also received attention during these inspections. Of 3,806 children examined, 27% were found with enlarged spleen.

Madras Presidency.

It was decided to credit to Government the fees received by officers of the Public Health Department for issue of sanitary certificates to schools. In

view of the elaborate public health staff in districts, there is a proposal to discontinue the practice of empowering medical officers to grant these sanitary certificates. In this connection the amendment of the relative sections of the Madras educational rules and the code of regulations for European Schools was under consideration of the local Government.

Assam.

Periodical medical examinations of pupils of selected institutions were carried out by medical officers and remedial measures were suggested and lectures on general hygiene and sanitation were delivered.

Burma.

Medical inspection of scholars was, as in 1933, limited to those English and anglo-vernacular schools which can either provide the cost or can arrange for its being done without remuneration. Health reports were available for 27 schools and of 6,979 pupils on their rolls, 98·5 % were examined. Of these 70 % were reported to be vaccinated ; 27 % revaccinated ; 2 % had had smallpox ; and 1 %, were unprotected. Common disabilities were defective teeth 19 %, enlarged tonsils 14 %, defective vision 6 %, trachoma 4 %, skin diseases 4 %, anæmia 4 %, defective throat 2 % and enlarged spleen 1 %.

Prompt measures were taken, when necessary, to check the spread of contagious disease. General sanitary conditions of school buildings, including arrangements for water supply and conservancy, were reported as satisfactory.

Health Education.

52. As far back as February 1913 the Government of India in their resolution on Indian educational policy dealt at length with the need for instruction in hygiene in schools and for medical inspection of pupils and schools premises, and an Imperial grant of 25 lakhs was made in this connection. Since that date practically all provinces have been teaching hygiene in the primary, middle and high school classes, though the extent to which the subject finds a place in school curricula and the actual classes in which it is taught vary somewhat from province to province. Most provinces have had special text books prepared, for the different grades of schools ; text books which include lessons on hygiene, public health, elementary biology, the dangers of alcohol, personal cleanliness, first-aid etc., etc.

In Madras such text books are available in English, Malayalam, Tamil, Telugu and Kanarese. Similarly in Bombay, as long ago as 1917, special text books were compiled. In Bombay hygiene is a compulsory subject in all primary schools and in all girls' schools in Sind, and physiology and hygiene are in the groups prescribed for the Matriculation course. In Bengal hygiene is a compulsory subject in all primary schools and is also included in the high school syllabus. In the U. P. hygiene is included in the syllabus for primary schools and for the middle sections of all vernacular schools and is an optional subject in the Intermediate examination. In the Punjab, physiology and hygiene are included in the school courses and also in the Matriculation course. In Burma hygiene is a compulsory subject in classes II to VII of vernacular schools and in the primary and middle sections of secondary schools.

It can also be stated that in schools in which no direct compulsory provision of a separate course in hygiene is made, lessons in hygiene, elementary biology and kindred subjects are almost universally included in the ordinary class text books in English or the vernacular and form a subject of study in the language classes.

Social and moral hygiene and sex instructions have also been adopted in the schools in India to a limited extent. Since the visit of the British Social Hygiene Council's delegation to India, some years ago, the question of this instruction has been considered in all provinces. Most provinces have gone rather cautiously in this matter. Recently enquiries have been made by the Government of India from provincial Governments regarding the extent and nature of the instruction given and the necessity for an extension of such instruction is to be discussed at the first meeting of the Central Advisory Board of Education.

Fairs and Festivals.

N.-W. F. P.

53. No untoward outbreak of epidemic diseases occurred at any of the fairs.

Punjab.

The most notable event was the Phalgu fair held in Karnal district from 24th September to 8th October, which was attended by 1½ to 2 lakhs of pilgrims. The main activities of the Public Health Department included the cleaning up of the Pharal village nearby and of the fair area, the provision of a camp bacteriological laboratory under an Assistant Epidemiologist, chemical examinations of milk, *ghee* and other food stuffs, chlorination of the sacred tank and well waters, provision of an infectious diseases hospital and of bore-hole latrines. This and other fairs passed off without a case of cholera or other epidemic disease.

Sanitary arrangements at all important religious and cattle fairs were as usual supervised by the district M. O. Hs. and the A. D. P. Hs.

Delhi.

No infectious disease broke out at any of the fairs.

United Provinces of Agra and Oudh.

The sanitary and medical arrangements of all important fairs and religious gatherings were, as usual, supervised by A. D. P. Hs., those of smaller ones by district health staffs. Additional staff from the cadre of reserve M. O. Hs. or medical officers in charge of travelling dispensaries were detailed for anti-epidemic and sanitary measures, and infectious disease hospitals were set up. Temporary regulations under the Epidemic Diseases Act were enforced as necessity arose. As usual, incoming and outgoing pilgrims to the Magh *mela*, Allahabad, and to others were inspected medically.

All fairs passed off without an outbreak of epidemic disease.

Bihar and Orissa.

In addition to the sacred towns of Puri, Gaya and Deoghar which attract large numbers of pilgrims every year from all over India, many *melas* of purely

local interest are held in different parts of the province. The *Pitripaksh mela* usually held at Gaya in September attracts the largest number of pilgrims in South Bihar while the *Harihar Chatra*, held at Sonepur (Saran district) in November with an attendance of about three lakhs was the biggest cattle fair.

The Snan and Rath-jatra festivals were held at Puri on the 27th June and 13th July. About 75,000 pilgrims visited Puri during the Car festival. The epidemic staff comprised 5 sub-assistant surgeons deputed by the provincial Public Health Department and one temporary medical officer appointed by the Puri Municipality. Routine preventive measures included the chlorination and treatment with choleraphage of all sources of water supply, treatment of all cholera contacts with choleraphage, arrangements for prompt reporting of cases of infectious diseases, ambulance carts for removal of cholera cases, anti-cholera inoculations among the local population before the *mela*, etc. It is gratifying to record that, although cholera cases were occurring at the time in Puri district and in other parts of India, the incidence of this disease in the *mela* area was not high and only 95 cases with 14 deaths were reported.

At the Sonepur fair, only one case of cholera was reported. Three M. O. Hs. were detailed by the provincial Public Health Department to supervise sanitary operations.

Sixteen attacks and 5 deaths from cholera were reported during the Pitripaksh *mela* at Gaya; but the disease did not assume epidemic proportions, although the attendance was nearly 60,000.

Bengal Presidency.

Except for 4 cases of cholera reported at the Ganga Sagar *mela* in the Presidency division and four at fairs in the Dacca division, this province again presented a clean bill of health.

Central Provinces and Berar.

Except for one case of cholera at the Sheorinarain fair in Bilaspur district, no epidemic disease was reported at any of the 86 fairs. Special arrangements were made for the disinfection of water supplies, conservancy and isolation and treatment of infectious cases. Eighty-two fairs were supervised by the epidemic and dispensary staffs, 2 by the health publicity officer and two by other medical officers.

Bombay Presidency.

At Pandharpur 9 cases of cholera, 2 cases of plague and 1 of smallpox were recorded during the Ashadi fair in July, which was attended by about 162,768 pilgrims. These cases were detected either before or soon after their entry into the fair area. The usual preventive measures were taken.

Except for one imported suspected case of cholera, the Kartiki festival at Alandi also passed off smoothly. There were 5 deaths from cholera during the Nivritti fair at Trimbak. Other fairs passed off uneventfully.

Madras Presidency.

There were 570 fairs and festivals of which 450 were celebrated during the first half of the year. All these passed off without an outbreak of cholera; except that a few imported cases occurred during five important festivals in the 2nd half of the year. Most of the important festivals in rural and urban

areas were as usual supervised by district health staffs, those in municipalities by M. O. Hs. where employed and the less important ones by health inspectors.

The district boards of Chittoor, East Godavari, Coimbatore, Tanjore, Madura, Anantapur, North Arcot, and Nellore carried out some permanent improvements in the pilgrim centres within their areas.

Assam.

All fairs passed off without an untoward event.

Health Propaganda.

Punjab.

54. No whole time publicity officer was employed but the provincial Public Health Department maintained an educational bureau which prepared propaganda material. The district M. O. Hs. delivered 20,009 lectures to school children and to audiences at fairs and on other similar occasions. Much valuable work was also done among women by the Inspectress of health centres. The most notable feature of the year was again the success of the public health section of the all-India exhibition held at Lahore, which was attended by several lakhs of persons. The health section, extending over 20 stalls, demonstrated the activities of the Public Health Department in the field of preventive medicine.

United Provinces of Agra and Oudh.

The Hygiene Publicity Bureau under the direction of an A. D. P. H., in addition to routine health propaganda supervised the health unit at Partabgarh, the composting work at Shahjahanpur, the village aid scheme and the medical inspection of schools. The publicity van of the provincial branch of the Indian Red Cross Society, equipped with models, films, posters and with a wireless set, travelled nearly 6,000 miles and gave 153 cinema shows to audiences numbering 132,000 persons. Cinema shows were also arranged on several occasions for ladies in Lucknow and during the local baby week, also during the Magh *mela*, Allahabad, and the Garhmuktesar fair. The touring motor dispensary maintained by the Lady Kinnaird hospital, distributed 2 lakhs of leaflets, 2,500 sets of posters and 5,000 other booklets at fairs and on other occasions in Lucknow district. Rural publicity work received attention in the districts of Partabgarh and Sultanpur. The Board of Public Health gave its usual grant-in-aid of Rs. 12,000 for the maintenance of the cinema section of this Bureau while local bodies contributed to the extent of Rs. 4,400, With a special grant of Rs. 5,580 from the local Government, a film on temperance was produced. Other new films produced included one on the activities of the Health Unit, Partabgarh.

Junior Red Cross groups, totalling 3,708 with a membership of 94,000, were at work in 2,886 schools, 91 per cent. being in rural areas. Their routine activities included health dramas, talks, songs, the preparation of health models, cleaning the school premises, etc., These groups are reported to have collected funds for making soak pits and improving wells ; they persuaded people to be inoculated and did considerable anti-malarial and anti-rat propaganda.

A syllabus was prepared for the public health training of village guides for purposes of rural uplift.

Bihar and Orissa.

The Public Health Bureau continued its usual propaganda work by means of distribution of literature, public health exhibitions at fairs and *melas*, lectures, demonstrations, etc. The A. D. P. Hs. carried lanterns and sets of slides for exhibition while on tour in rural areas. The Red Cross health museum was maintained.

Bengal Presidency.

Twelve cinema parties worked in the Presidency under the supervision of the district M. O. Hs.; they gave 1,444 cinema shows and lectures to audiences totalling over 18 lakhs of persons and attended about 20 health exhibitions. One party was attached to the Government touring exhibition which travelled over 4 districts in Burdwan division and held 59 exhibitions. Radio, as a means of propaganda, was tried with success, 50,000 leaflets and 15,000 posters were distributed and four new films on malaria, tuberculosis, Calcutta health exhibition and the medical college centenary celebration were prepared.

Central Provinces and Berar.

The two health publicity officers visited 112 centres and delivered lectures. The epidemic assistant medical officers carried out similar work in rural areas.

Bombay Presidency.

Usual health propaganda connected chiefly with maternity and child welfare was continued by the 17 sanitary associations in existence. The Karachi sanitary association organised health talks to 24,548 women. The Broach association, in addition to the distribution of health literature, gave 48 magic lantern lectures on public health subjects and arranged health exhibitions in many places. The Ahmedabad Association arranged an exhibition at the South Daskroi taluka village uplift conference and exhibited models and charts on Red Cross Day. Under the auspices of the Bombay Association, hygiene lectures were delivered to the working classes. Other associations also worked according to local requirements. Sanitary and vaccination inspectors delivered lectures during tours on general sanitation, personal hygiene, etc.

Madras Presidency.

Several portable cinema sets and suitable films are now available for propaganda work in the districts. Pamphlets, leaflets, posters, slides, magic lanterns and films are stocked in the propaganda section in the D. P. H's. office and are supplied on demand to local bodies, health staffs and others. The district boards of Nellore, Cuddapah, Coimbatore and Chittoor maintained motor vans equipped with cinema machines, magic lanterns, health exhibits, etc., which toured into remote villages for the purpose of health propaganda. The health week was celebrated throughout the Presidency.

Altogether 139,186 lectures and short talks, 18,852 magic lantern demonstrations and 621 cinema shows were given to audiences tatalling 78 lakhs. In addition, 1,461 health exhibitions and 813 health dramas were produced.

Four and 15 new leaflets on leprosy and tuberculosis, respectively, and a new set of coloured slides on plague were issued; gramophone music was

utilized for the first time for health education and 4 popular songs on flies, consumption, ante-natal care and care of the child were issued as gramophone records. Special grants-in-aid were given for temperance propaganda.

Assam.

Health propaganda, restricted in 1933 owing to financial stringency, was revived this year especially in regard to tuberculosis, the expenditure being met partly by the local Government and partly by the King George's Thanksgiving (Anti-Tuberculosis) Fund. Six sets of tuberculosis slides were purchased and 12 picture posters on tuberculosis were produced and distributed.

Burma.

The hygiene publicity bureau remained in charge of a specially selected Burman sub-assistant surgeon. During 1934, 132 lectures and 124 cinema demonstrations were given to audiences estimated at 90,000 in 21 towns and 38 villages. The Burma branch of the Indian Red Cross Society sanctioned a sum of Rs. 800 for the purchase of an additional copy of the Rockefeller Foundation film on malaria and for the local production of a Burmese film on child welfare. A total of 411,257 leaflets, cards, specimen lectures, handbills and posters was issued to the public; an English pamphlet entitled "The need for child welfare work in Burma" and three Burmese posters were added to the Bureau's stock.

The health staffs delivered 6,586 health talks or lectures, gave 213 magic lantern and 9 cinema demonstrations to audiences totalling 421,511 in rural and urban areas, and distributed 198,212 copies of health pamphlets, posters, etc.

Rangoon health week exhibition was again arranged in sections, each dealing with a specific phase of public health and this annual exhibition has proved most valuable as an educative measure and is exceedingly popular.

Industrial Hygiene and Mines.

55. The daily average number of persons who worked in and about mines regulated by the Indian Mines Act, 1923, was 192,210 men and 37,171 women. Underground labour totalled 109,023 men and 11,193 women. Of the women, 6,305 were employed underground in the coal mines in Bihar and Orissa, 3,914 in Bengal, 839 in C. P. and 135 in the salt mines in the Punjab. Deaths totalled 209 of which 157 occurred in coal mines alone; 73 persons lost their lives by falls of roofs, 60 by falls of sides, 4 in shafts, 16 by explosives, 20 by haulage, 15 by other accidents underground and 21 on the surface.

With a view to minimise accidents and to prevent the occurrence of miners nystagmus, the attention of owners, agents and managers of mines was drawn this year to the British Coal Mines General Regulations (Lighting), 1934, which provide for improvement of lighting conditions below ground.

In Bengal and B. and O., although the prevalence of cholera increased this year, the general health of workers in the Jharia and Raniganj Mining Settlement was on the whole satisfactory. The estimated population of the Jharia Mining Settlement was 530,022 and the death rate was 18 p. m. Cholera was the cause of 916 cases with 413 deaths. There were 959 cases with 71 deaths from smallpox.

The Board's maternity and child welfare scheme was further extended. Jharia, the largest town of the coalfield, has now 3 maternity and child welfare

centres, the staff consisting of two health visitors and 5 midwives who trained 41 indigenous *dais*, while a nurse for child welfare work was also engaged by the Dhanbad municipal board. Three outdoor leprosy clinics at Jharia, Katras and Dhanbad continued work ; 402 new patients attended and 17,088 treatments were given.

In the Asansol Mining Settlement, the birth rate was 29 p.m. and the death rate 22·3 p.m. The health of the colliery population, *i.e.*, the miners and their families, remained good. Mortality from fevers and respiratory diseases was high owing to the greater prevalence of malaria and pneumonia. There were 355 attacks and 151 deaths from cholera, anti-cholera inoculations numbering 73,819. Attacks and deaths from smallpox numbered 130 and 23, respectively and 13,840 primary and 36,523 revaccinations were performed.

The maternity and infant welfare scheme has three centres, each under a health visitor, with a lady Superintendent in charge. A health and baby week was organised in 8 areas under the joint auspices of the Board of Health and the local Health and Baby Welfare Society. There were 8 leprosy clinics, 4 maintained by the Board of Health and 4 by the Asansol Leprosy Relief Association.

Classes in first-aid were, as usual, held at 20 centres in the Jharia Coalfield, in the Mining areas of Singhbhum and Hazaribagh and in the Raniganj coalfields, 210 persons being awarded certificates.

Little progress is reported to have been made in housing and sanitation.

In Assam, Madras, Punjab, Burma no outbreaks of epidemic disease were recorded.

In the C. P. cholera was prevalent in a mild form at Balaghat causing 12 cases and 3 deaths, and at Tirody mine involving 156 cases and 33 deaths. Preventive measures included 3,069 anti-cholera inoculations. Malaria was unusually severe. Smallpox caused 130 attacks with 37 deaths during an epidemic at Tirody and 3,000 persons were vaccinated. The dispensaries maintained by the Manganese Ore Co., Ltd., continued to work usefully.

In Burma anti-malarial measures at Namtu and Bawdwin were continued while Tavoy and Mergui districts were free from serious epidemics.

The Factories Act, 1934, repealed the Act of 1911 and subsequent amending Acts. The total number of factories at work was 8,658 of which 4,023 were perennial and 4,635 seasonal. Nearly 70 % of the perennial factories were in the presidencies :—Bengal (1,139), Bombay (871) and Madras (720). In the C. P., Assam and Burma, factories were principally seasonal. District and municipal Health Officers continued to act as *ex-officio* additional inspectors of factories.

The average daily number of persons employed increased from 1,405,402 to 1,487,231. Women workers numbered 220,860 and children 18,362, these representing 15 % and 1 % of the total factory population.

Recorded accidents included 233 fatal, 1,440 serious and 16,114 minor. More extensive use of machinery was partly responsible for a higher number of accidents ; as also the development of new industries involving risks either unknown or insufficiently appreciated, increased pressure of work and increased unemployment, etc. Safety committees continued their useful work in some factories. The general health of factory employees was reported to be normal and no dislocation of industry occurred from epidemic disease.

Considerable progress was recorded with housing schemes in the U. P., Bombay, Punjab and Bengal. In Bengal the Bhatpara

water-borne sewage scheme was nearly completed, but in the C. P., water scarcity continued to hamper progress in this direction. The disposal of trade waste from the Ahmedabad mills in the Bombay Presidency and of effluent from sugar factories in the U. P. continued to present difficulties.

In the latter province crude waste water including filter press washings and molasses used to be discharged into rivers and onto lands adjoining them with considerable nuisance. For the disposal of sludge from the filter presses, the Public Health Department recommended mixing with earth, drying on platforms and subsequent use as manure. Analyses of factory effluents were made at the provincial Hygiene Institute indicating the necessity for treatment before discharge into watercourses or onto land. Standards of purity have now been laid down with a view to regulate such discharges, and byelaws have been amended to place the responsibility for the treatment and disposal of effluents in a sanitary manner on to the factory owners.

Improvements in ventilation were carried out in several factories in the Bombay Presidency and the question of better methods of dust removal in metal polishing factories also received attention. In Bengal, although lighting and ventilation were improved somewhat, many buildings in which small factories are housed still provide the chief obstacle to progress. In B. and O. in some factories in which mechanical removal of dust was not feasible, isolation of the dusty processes was effected.

Progress in welfare work included the provision of a crêche and the supply of milk and barley to children in one factory at Calicut and weekly free distribution of rice to children in a tea estate in Madras Presidency. In the Bombay Presidency the provision of crêches, the passing of a MaternityBenefit Act and the development of maternity homes in recent years are all steps in the right direction. In Bengal welfare activities included improvement of houses, bathing and drinking water facilities, appointment of medical or welfare staffs, recreation facilities for children, etc. In other provinces also welfare work received attention.

Accidents totalled 20,787 of which 95 % were recorded in perennial factories. Nearly 50 % of all accidents occurred in the Bombay and Bengal Presidencies.

Adulteration of Food.

N.-W. F. P.

56. The Punjab Pure Food Act, 1929 and the N.-W. F. P. pure food rules, 1931, were in force except in the notified area of Nowshehra Kalan. Of 104 samples of *ghee* and 23 samples of milk examined in the provincial laboratory, 44 (42 %) and 10 (43 %) were found adulterated.

Punjab.

A total of 1,021 samples, including 739 of milk, 60 of *ghee*, and 162 of water, were examined at the public health chemical laboratory. Milk samples included 681 examined at Phalgu during the fair held there (referred to in paragraph 53 on page 131) while 58 were received from local bodies, 56 % of the former and 42 % of the latter proving adulteration. *Ghee* samples included 32 submitted by local bodies, of which 70 % were adulterated, while 48 % of water samples were found unfit for domestic use. A standard of purity for malt vinegar was worked out.

During 1934, the Public Health Department chemist acted as Public analyst for 17 municipalities.

A six months course of training for public analysts was provided in the laboratory for three persons.

United Provinces of Agra and Oudh.

By the end of 1934, the U. P. Prevention of Adulteration Act was in force in 85 municipalities, 5 districts and 30 notified areas, also in several rural tracts and town areas. Altogether 6,448 samples were analysed by the Government Public Analyst; these included *ghee* 3,778, milk 1,675, edible oils 728, flour 72, butter 52, vegetable products 26 and others 117; of these samples 24 % were found adulterated.

Bihar and Orissa.

Over 700 food samples were examined in the Public Health Laboratory including 368 of *ghee*, 248 of mustard oil, 20 of sweets, 24 of milk and 32 of *atta*. Adulteration was found in 62 % of *ghee* samples, 38 % of mustard oil, 75 % of sweets, and 99 % of milk.

Bengal Presidency.

Of 5,707 samples of foodstuffs analysed at the Bengal Public Health Laboratory, 3,403 were received from districts and 1,496 from municipal boards. The percentage of adulteration is shown in Table IV (*iii*).

TABLE IV (*iii*).

Percentage of adulteration.

	District Boards.			Municipalities.		
	1932.	1933.	1934.	1932.	1933.	1934.
Mustard oil	53	33	18	42	28	19
Ghee	38	23	48	27	28	35
Milk	70	77	68	60	72	80
Butter	75	..	50	67	83	42
Dahi	57	86	100	63	78	80
Chhana	62	16	14	..	..	33
Atta and wheat flour	2	..	2	2	2	..
Tea	..	..	7	..	..	6

The liter value of 29 samples of mustard oils of three species was found to range from 16 to 21, the average being 18, while the acetyl value of 14 samples varied from 20 to 88. The specific gravity of the same 14 samples at 15·5°C. taken by a Pyknometer ranged from 0·9128 to 0·9175.

Examinations of food samples made in the Dacca Public Health Laboratory showed adulteration as follows:—

	District Boards.		Municipalities.	
	Total examined.	Per cent. adulterated.	Total examined.	Per cent. adulterated.
Ghee	26	57	109	44
Mustard oil	1,112	48	78	16
Milk	354	76	343	44
Butter	..	..	11	100
Dahi	66	87	8	50

Central Provinces and Berar.

The Public Health Institute carried out the analysis of 5 samples of butter and 8 of *ghee*, and reported adulteration in 4 and 6 respectively.

Bombay Presidency.

The Bombay Prevention of Adulteration Act of 1925 was in force in Karachi, Ahmedabad, Surat, Shikarpur and Broach. The chemical assistant in the Karachi laboratory, who is public analyst for Karachi, examined 1,211 samples of food-stuffs in addition to 207 samples of *ghee* for the use of Asiatic crews.

Madras Presidency.

The Madras Prevention of Food Adulteration Act was in force in all municipalities, employing M. O. Hs., in 6 other municipal towns and in one *Panchayat*. Of 6,200 food samples examined, 44 % were found to be adulterated. Under Madras Government No. 2479, Public Health, dated the 25th October 1934, the adulteration of gingelly oil was prohibited.

Assam.

Table IV (*iv*) gives the principal examinations of food samples and their results.

TABLE IV (*iv*).

	No. examined.	No. adulterated.	
		No.	Per cent. of total.
Milk	369	175	48
Ghee	92	55	61
Mustard Oil	99	38	40
Cocoanut Oil	5	4	80
Tea	10	3	30

Burma.

Food samples examined at the Harcourt Institute of Public Health, Rangoon, included *ghee* 108 with 25 showing adulteration ; rice 33 and 19 ; mustard oil 32 and 16 ; milk 32 and *nil* ; rice bran 28 and *nil* ; *dhal* 7 and 1.

Of 76 samples of *ghee* from Rangoon analysed under the Burma *Ghee* Adulteration Act, 10 proved adulterated.

Railways.

(*a*) Bombay, Baroda and Central India Railway.

57. Under a chief medical officer, this railway employed 7 district medical officers, 71 assistant and sub-assistant medical officers, 59 dispensers, 2 matrons, 5 nursing sisters, 5 nurses, 1 drug inspector and 1 anti-malaria inspector. In addition, a number of civil surgeons and other medical officers were subsidised for services to the railway staff. Out of 359,388 new cases treated at railway hospitals and dispensaries during 1934-35, causes of sickness were classified in respect of 351,572 cases as follows ; air-borne cases 52,624, food and water-borne 39,778, insect-borne 66,497, infectious diseases 977, pyrexia

of uncertain origin 14,003, diseases of direct contagion 861, food deficiency 206, injuries 26,454 and other causes 150,367.

Cholera and plague were responsible for one case each, and of 266 cases of smallpox, 180 occurred among the unvaccinated. There were 5 cases of c. s. fever of which 4 proved fatal.

The anti-rat campaign and the usual anti-malarial measures were continued. A total of 8,900 vaccinations against smallpox, 105 inoculations against typhoid, 195 against plague and 2,476 against cholera were performed, and 214 persons were given anti-rabic treatment at the Ajmer Railway Hospital and 61 at other non-railway centres. Forty first-aid training classes were held and 370 out of 617 candidates obtained certificates ; 17 were trained in home nursing.

(*b*) Madras and Southern Mahratta Railway.

This railway has 4 headquarters hospitals, 40 dispensaries and 3 first-aid posts. The headquarters hospitals are adequately equipped and facilities exist for major operative surgery in 3 of them. Over 3,400 inpatients were treated at these hospitals.

Of a total of 327,547 cases treated during 1934-35, malaria accounted for 5,834, dysentery 5,233, diarrhœa 3,654, smallpox 162, typhoid fever 130, measles 62, cholera 20 and plague 7 cases ; while accidents were responsible for 28,920 and other causes 283,525 cases. Anti-cholera and anti-plague inoculations numbered 4,776 and 2,211, respectively and, although vaccination is not compulsory, 9,328 primary and re-vaccinations were performed and were largely responsible for the low railway incidence of smallpox in an epidemic period. The health department has taken notice of the high incidence of dysentery and typhoid, and preventive measures, especially improvement of water supplies, were being carried out.

A nursing service has been provided and midwives have been posted to various stations ; there is a health visitor and a welfare centre at Perambur and baby weeks are held annually at Guntakal and Bezwada. The midwives in Perambur conducted 127 confinements in the families of the railway employees and 55 other cases. Of 1,210 employees examined in ambulance work, 746 passed the test.

During the meeting of the medical section of the Indian Railway Conference held at Bangalore in July, 1934, experiments were carried out in the use of hydrocyanic acid powders (calcid and zyklon B) for the disinfestation of coaching stock. The results were not favourable.

(*c*) South Indian Railway.

There is one chief medical officer, and four district medical officers on this railway.

A total of 34,749 cases were treated including 11,930 due to infectious diseases. The total loss on account of sickness was 223,494 days or an average of 6·4 days per head. The death rate amongst employees was 3·9 *per mille*. Plague was absent ; influenza was responsible for 3,673 cases and the number of days lost through this cause was 20,287. Cases of dengue numbered 247, cholera 48 with 20 deaths, and smallpox 124 with 12 deaths.

Malaria is not a serious problem ; 107 indoor cases were treated with atebrin and plasmoquin with satisfactory results. Outdoor cases numbered

only 1,362 and these were treated with cinchona febrifuge, quinine, etc. The occurrence of sprue, diarrhœa, chronic dysentery and many chronic ailments, *e.g.* anæmia, rheumatism, etc. both with and without a history of dysentery was studied.

Sanitary and conservancy arrangements were on the whole satisfactory. The ambulance course was improved; 147 employees completed the full course of lectures in first-aid and 86, including 2 officers, passed. Medical examination of school children was continued.

(*d*) Great Indian Peninsula Railway.

To meet the medical and sanitary needs of a staff of 80,261 as well as their dependents, spread over 3,627 miles of railway line, this railway maintained in addition to the Principal Medical and Health Officer, 11 district medical officers, 2 assistant medical officers, 21 assistant surgeons, 38 sub-assistant surgeons, 1 matron, 25 nursing sisters, 5 nurses, 3 health assistants, 24 sanitary inspectors, 1 malaria overseer and 49 dispensers. The cost of medical services aggregated to Rs. 5,86,303 and that of health services Rs. 4,11,473.

Altogether at the different railway medical institutions 183,275 cases were treated. The daily average attendance of employees at hospitals and dispensaries was 1,324. The number of days lost from sickness was 658,035 or more than 8 days per employee, the resultant financial loss amounting to Rs. 10,77,916. The most important causes of sickness were malaria and " other fevers ", nearly 8 % of the total strength suffering from malaria and 18 % from other fevers.

The incidence of malaria was as usual highest in October and lowest in May. Routine anti-malarial measures were carried out. Influenza prevailed throughout the year, and was responsible for 7,002 cases with 2 deaths. Tuberculosis of the lungs was responsible for 190 cases with 7 deaths. Five non-fatal cases of plague, 67 cases of cholera with 17 deaths and 727 cases of smallpox with 26 deaths were recorded. There were 684 inoculations against plague, 20,856 against cholera and 14,807 vaccinations.

The birth rate was 11 p.m. and the death rate 6 p.m. The infantile mortality rate within railway premises rose to 247 per 1,000 births, Bombay District again giving the highest rate (344) and Bhusaval district the lowest (76).

At the anti-rabic treatment centres at Byculla, Bhusaval and Jhansi, 204, 43 and 96 cases respectively were treated.

Accident relief medical equipment was maintained at 36 railway stations and 483 first-aid boxes were supplied to the transportation department. Forty-four classes in first-aid were held, and of the 365 candidates, 273 obtained certificates, 10 vouchers, 4 medallions and 2 labels.

The Bhusaval infant welfare and maternity centre continued its useful work.

SECTION V.

MEDICAL INTELLIGENCE AND INTERNATIONAL HEALT INCLUDING PORTS.

Epidemiological Intelligence.

58. The office of the Public Health Commissioner continued to act as the epidemiological bureau of the Government of India. Issues of epidemiological returns included :—

(1) Weekly statistics of reported attacks and deaths from the major epidemic diseases in British India and Indian States;

(2) A weekly epidemic diseases bulletin containing a summary of epidemiological information concerning both India and foreign countries and other items of special interest to health officers. Part I is concerned with India alone and has a wide distribution; Part II, which for the most part includes information from outside India, is distributed in India only and consists of 6 sections dealing with vital statistics, quarantinable diseases and other health matters under the following categories :—

(*a*) The latest weekly wireless statement of the League of Nations, Health Organisation, Eastern Bureau, Singapore, as broadcast from Saigon and Malabar (Java).

(*b*) Epidemic disease incidence of foreign countries and ports, excluding Great Britain and the United States of America;

(*c*) The latest weekly information from Washington of deaths from all causes in certain large cities of the United States of America;

(*d*) Extracts from the weekly statement on England and Wales issued by the British Ministry of Health.

(*e*) A list of foreign countries and ports in which known or suspected cases or deaths from cholera, smallpox, plague, typhus and yellow fever occurred during the 12 weeks ending the period to which the weekly summary relates, and

(*f*) Notes on public health matters; communication from the "Office International"; proceedings of the Quarantine Commission of the "Office International"; articles on port health, etc.;

(3) Weekly mortality figures of certain diseases including "conventional" diseases in the chief sea-port towns;

(4) Weekly recorded vital statistics in respect of towns in British India having a population of 30,000 and over;

(5) Weekly cables to the British Ministry of Health and the Eastern Bureau of the League at Singapore, giving a review of the epidemiological conditions in ports as well as inland. Additional information is sent to the Eastern Bureau by post in regard to (*i*) infected ships arriving at Indian ports, (*ii*) ports in India declared infected and (*iii*) infected rats. The Ministry of Health includes this information in its weekly record of infectious diseases of ports; the Eastern Bureau incorporates the information in its weekly broadcasts issued from Saigon and Malabar;

(6) In accordance with the requirements of the International Sanitary Convention, 1926, periodical reports to the Eastern Bureau of the League

in regard to conventional diseases under articles 1, 2, 4, 6, 9, 12, 14, 16, 28, 50 and 57 of the Convention ;

(7) Quarterly Abstract of Vital Statistics in British India and Indian States ;

(8) On request from the Health Section of the League at Geneva statistical data in regard to notifiable diseases ; and quarterly review of the incidence of certain diseases in British India to the International Statistical Institute, the Hague.

Of these Nos. 1, 4 and 7 are published in the Gazette of India.

General.

59. The activities of the Office International d'Hygiene Publique and the Health Section of the League of Nations are as usual described in some detail in so far as they concern the bi-annual meetings of the former in Paris on the one hand and the Singapore Bureau, the Health Committee of the League of Nations and its various commissions on the other.

Office International d'Hygiene Publique, Paris.

60. (A) Lt.-Col. J. Taylor, D.S.O., I.M.S., as delegate for India, attended the spring meeting held at Paris from the 30th April to 9th May, 1934.

In the plenary session opened on 28th April under the presidency of Sir George Buchanan, reference was made to the recent deaths of Drs. Calmette and Cantacuzene, who had been associated with the work of the " Office ". The various sectional " Commissions " were constituted and the greater part of business was as usual transacted through them. Col. Taylor was appointed a member of the following five commissions :—Quarantine, Aerial Navigation, Yellow Fever, Cholera and Opium.

(*a*) The important problems dealt with by the Cholera Commission were :—

(*i*) *The efficacy of anti-cholera inoculation with a single dose.*—The Commission recommended that, while inoculation by means of a single dose was of definite value as in the Dutch East Indies, British India, Iraq and Indo-China, and could be employed under circumstances where it was the only practicable method, inoculation by two injections should remain the method of choice. This recommendation is in accordance with the views held in India.

(*ii*) *The preparation of a standard agglutinating serum for cholera vibrios.*—The report of the Cholera Commission sums up the results of the studies which have been made on the serum and on the antigens used in their preparation. It has been shown that the sera prepared by Drs. Madsen and Cantacuzene are the same qualitatively and similar to those used in many laboratories.

" Office ".—Office International d'Hygiene Publique, 195, Boulevard Saint Germain, Paris.

" I. S. C."—International Sanitary Convention.

The comments and the decision of the Commission are contained in the following extract from their report to the plenary session :—

" To sum up, the greatest uncertainty still prevails regarding the significance of these non-agglutinable vibrios isolated from clinical cases of cholera. Are they merely variants of the principal agglutinable type, possibly in some cases the result of a modification which has taken place immediately after isolation, or are they fixed races ? Can they, in either case, and especially in the first, be grouped into serological types—If such types exist, is the disease caused by them identical with true cholera ? What is their importance from the epidemiological point of view ?

" Prolonged and careful investigation will be necessary to elucidate these problems and it forms part of the programme of study to be carried out in British India.

" On the other hand, the recent work of Dr. Bruce White has led him to suggest that an important advance might be made by using, in the preparation of an agglutinating serum, only the O antigen of the cholera vibrio, *i.e.*, a heated antigen. On this experiments will be carried out simultaneously in India and in the National Institute for Medical Research, London.

" In conclusion, the Cholera Commission does not think that the preparation of a standard serum can be contemplated for the time being. Extensive and difficult preliminary investigations are necessary and the Commission considers that these investigations should preferably be made in countries in which epidemics of cholera and choleraic diseases occur. The investigations will have to clear up among others, the following points :—

" (*a*) What would be the practical advantage in diagnosis of the use of serum prepared with the O antigen of the cholera vibrio ?

(*b*) Do different serological types occur in true cholera and how can they be distinguished one from another ?

(*c*) If such types can be distinguished, what are, in each case, the characteristics of the corresponding clinical form and its rôle epidemiologically ?

The Commission emphasises the importance of submitting all the strains of vibrio to careful study from the point of view of fermentation, in addition to their other characteristic properties."

(*iii*) *The use of bili-vaccine as a method of cholera prophylaxis in the case of pilgrims proceeding on the Haj.*—At the request of the Public Health Commissioner with the Government of India, the suitability of this method of prophylaxis was discussed with a view to ascertain whether the method was likely to be acceptable in place of the present procedure of subcutaneous inoculation. The consensus of opinion in the plenary session was that the oral method of immunisation was less effective and that it was not considered acceptable as a method for application during the pilgrimage to Mecca.

(*b*) The Quarantine Commission, among other subjects dealt with :—

(*i*) The optimum conditions which might be recommended for fumigation by the various processes employing sulphur ;

(*ii*) The application of Article 28 of the I. S. C. to loaded ships ;

(*iii*) The transport of sacks and jute cloth ;

(*iv*) Withdrawal of deratisation certificates ;

(*v*) Ports declared infected ;

(*vi*) Removal of Karachi from the list of ports qualified to give deratisation certificates.

Dr. Stock of the Ministry of Health who had been asked at the session of October, 1933, to submit to the " Office " provisional suggestions as to suitable standards for fumigation with S. O_2 submitted a valuable report which related chiefly to the combustion of sulphur in open containers, use of Salforkose

(combustion of carbon bisulphide), Clayton gas, by vaporisation of liquid SO_2.

The Commission in accepting most of Dr. Stock's conclusions insisted that the question at issue was not that of laying down compulsory standards, nor even of rigorously fixing, particularly in respect of the conditions which would permit the acceptance or otherwise of certificates of deratisation of ships, either the quantities to be used or the effective time of contact required for a satisfactory fumigation. These can in fact vary according to local circumstances of climate (temperature and humidity), equipment of the port and otherwise. But it was none the less useful to indicate the limits within which a fumigation by sulphur would appear *a priori* to be satisfactory. The Commission also pointed out that in dealing especially with fumigations by sulphur (for the reason that such fumigations are still practised in a considerable number of countries), it is in no way its intention to advocate the use of any one particular process of fumigation.

In the opinion of the Commission, in general, whatever the process employed, it is necessary to require that the vessel should have been suitably prepared for the fumigation; rat harbourages should as far as possible have been opened up, bilges have been pumped out, and compartments have been carefully closed during the period of exposure.

(*ii*) *Periodical deratisation with loaded holds.*—The Commission noted that Article 28 of the Convention does not insist on deratisation being carried out with empty holds and there are many ships which are practically never empty, but it was considered that under certain circumstances it would appear to be advisable to defer deratisation until a ship could be fully unloaded before deratisation under the Convention and issuing a certificate.

(*iii*) *Alleged importation of plague to Peruvian ports by the Agency of fleas present in jute cargo from Calcutta.*—The Peruvian Government, suspecting that the S. S. "Solafric", which carried a cargo of jute from Calcutta to Peru, had introduced plague into Peruvian ports, imposed certain special restrictions on jute cargoes from Calcutta. These included the storage of jute bales for a period of 60 days and fumigation at the port of loading. The allegation of the Peruvian Government was that fleas present in the bales loaded at Calcutta were found alive and were infective when the ship arrived at Peru and that this was the factor responsible for the dissemination of infection. The matter was discussed, both in the plenary session and also by the Quarantine Commission in its two aspects, *viz.*:—(1) the general question of the risks which might exist of transmission in the manner suggested; to be taken in the Plenary Session; (2) the specific case of infected fleas in jute cargoes from Calcutta with the necessity of placing restrictions on such cargoes; to be dealt with by the Quarantine Commission in the first instance. The case of the Government of India for the removal of these restrictions was presented by the delegate for India in a comprehensive note dealing with the origin of the cargo of the "Solafric" and the circumstances of her voyage to Peru.

The Commission recommended that the terms of the I. S. C., 1926, would appear to provide adequate means for protection against the importation of plague and that exceptional measures were unnecessary. The matter was discussed in full session and the consensus of opinion was opposed to the Peruvian restrictions which have since been withdrawn.

(*iv*) The subject of the removal of Karachi from the list of ports qualified to give deratisation certificates was mentioned both in the Plenary Session and at the meeting of the Commission ; it was considered advisable that when a port was taken off the list of those qualified to give deratisation or exemption certificates, the detailed reasons for such action should be communicated to the " Office ".

(*c*) Discussions in the Yellow Fever and Aerial Navigation Commissions related chiefly to the action to be taken with reference to Article 38 in the light of new observations on yellow fever, which have been made since the text of the Convention was drafted, and to the interpretation of the provisions of Articles 36 and 38 of the I. S. C. for Aerial Navigation, in relation to the special circumstances in the areas where positive mouse protection tests had been demonstrated without the occurrence of cases clinically recognisable. The reliability and significance of the mouse protection test was considered. As a result of tests with sera from known yellow fever areas in Africa and South America, from areas in South America where localised outbreaks have occurred at known date and from areas in these countries where yellow fever has not occurred, it has been concluded that the error of the test is less than 1 per cent. and that the positive results in areas definitely free from infection are probably due to experimental variations. The fact that in Brazil, amongst a population of 800 in which 19 cases had occurred, 60 per cent. were found to be immune suggested that an immunising infection may occur without the production of clinical symptoms of yellow fever. After considerable discussion a carefully drafted report was submitted, in which the opinion was expressed—that the provision of anti-amaryl aerodromes and the application of the other obligations of section II of the Convention should not be insisted on in the so-called " silent " areas where positive mouse protection tests formed the only evidence of yellow fever. This decision does not meet India's position and the reservations which the Government of India have already made when signifying their intention to adhere to the Convention would appear to provide a basis for action which may be considered necessary in regard to aeroplanes coming from such areas.

The results of the investigations into the presence of immune bodies against yellow fever in the blood of persons who have recovered from dengue on the whole tend to indicate that no effective immunity is produced ; in fact one series of investigations carried out by Sawyers' technique gave entire negative results.

The delegate for India informed the Aerial Navigation Commission that the Government of India had under consideration the question of the equipment of aerodromes necessary to enable them to ratify the Aerial Convention in due course. The Convention, which has been signed by 23 countries by April, 1934, still required 10 more countries to sign it before it could come into operation.

(*d*) The Smallpox Commission mainly dealt with the study of the best method of vaccination against smallpox. It was decided to publish their report on the subject, which has important chapters on the influence of the length and number of incisions, distribution and persistence of the virus in the body, criteria of successful vaccination, methods for determining immunity, duration of immunity, and standards of virulence of lymph.

(*e*) The Commission dealing with the international arrangements for the treatment of venereal diseases under the Brussell's Agreement of 1924

considered the revision of the " personal card ", and the standard courses of treatment.

(B) At the October meeting of the " Office " India was again represented by Lt.-Col. Taylor. The Quarantine Commission considered various problems arising out of the administration of quarantine regulations and the conventions and agreements relative to quarantine work. Regarding the double fumigation of ships, it was considered desirable to obtain the views of signatory countries before deciding whether an addition to the Convention requiring a second fumigation would be likely to be accepted. In discussing the abolition of bills of health and consular visas thereon, a point arose as to bills of health in the Panama Canal. At present no such documents are necessary in this zone in the case of ships not subsequently touching at an American Port. The question of unifying the regulations for the Panama Canal zone with those of the United States was under consideration. This would result in Bills of Health being required—a move in the opposite direction from the purpose of these International Agreements. The subject of quarantine message by wireless was discussed both in full session and by the Quarantine Commission, which recommended their adoption for all ports of each country.

The Government of India statement of the reasons leading to the removal of Karachi from the list of ports qualified to give deratisation certificates was noted. Other matters discussed included construction of rat proof ships, high sanitary dues exacted from shipping companies in certain countries, infractions of quarantine regulations, and the appointment of an " Office " delegate to the Pan-American Sanitary Conference at Buenos Aires. Some of these subjects were earmarked for further discussion at the next meeting. The several communications presented to the Commission included one on fumigation by sulphur dioxide from India.

The Yellow Fever Commission discussed five notes containing fresh information on the recent epidemiology of yellow fever, on the results of further mouse protection test surveys and on inoculation.

These show that investigations carried out in Africa are rapidly throwing light on the distribution of the disease. At Wau in the Bahr-el-Ghazal, hitherto treated as a " silent " area, a case diagnosed as yellow fever on the basis of clinical symptoms and histological examination of liver sections has been recorded.

Col. S. P. James presented a report summarising the areas where the tests have proved positive without the recognition of clinical cases. The necessity for continuing investigations into the specificity of the test was emphasized. Laigret's new method of immunization in French West Africa, differing from those previously employed in that immune serum is not used along with the virus, was discussed, and the Commission expressed the opinion that the use of a living vaccine without immune serum may entail some risk. As regards the relative values of different methods of protective inoculation, comparative tests in yellow fever areas were recommended.

The subjects dealt with by the Aerial Navigation Commission included reports of the ratification of the International Sanitary Convention, the different regulations for anti-cholera inoculation and vaccination against smallpox in countries through which aircraft pass from India, the eradication of mosquitoes from aeroplanes, sanitary taxes on aeroplanes and passengers, and the Yellow Fever Commission report in relation to the I. S. C. for Aerial Navigation. Ten ratifications were still required to bring the Convention into force. The delegate for India explained the position in regard to India,

i.e., the proposed action taken to equip Karachi as a " sanitary aerodrome " under the Convention, as a step towards ratification.

The delegate for India presented Health Bulletin No. 20 prepared by Lt.-Col. Sinton, which describes the lines of investigations to be carried out in India into the eradication of mosquitoes from aeroplanes. General opinion was in favour of spraying with mineral oils to which pyrethrum preparations had been added.

The trend of discussion on the present high sanitary taxes imposed on aeroplanes was in favour of restriction of taxes to the amount required to cover the costs of special measures taken.

The most important topics discussed in the Cholera Commission included (*i*) the preparation of standard " O " antigen in a dried form for the purpose of raising high titre serum ; (*ii*) the study of the El Tor vibrios, with a note by Dr. Doorenbos on the subject. The Cholera Commission took note of a communication by the delegate of Great Britain dealing with work undertaken in England in association with workers in India, on the preparation of a standard " O " antigen for the preparation of high titre diognostic sera. The use of such an antigen would make it possible for workers in any part of the world to obtain comparable serological results and so obviate the difficulties which may occur from the use of vibrio strains liable to variation.

Dr. Doorenbos's note summarised the position as follows :—

" The presence of vibrio carriers among pilgrims returning from the Hedjaz has been revealed for five consecutive years at the Tor Lazaret, and in 1934, the number of such carriers was relatively high compared with the four preceding years. In spite of the fact that it has been possible clearly to differentiate the vibrios isolated from these carriers from the epidemic cholera vibrio, we are of opinion that they represent the true cholera vibrio in a " disequilibrated " and attenuated form."

" If a large number of carriers of cholera vibrios, of whatever type, were found among pilgrims returning from Mecca, we should suspect the existence of a source of specific contamination in the Hedjaz."

The Commission expressed the view that in order to ascertain the presence of carriers among the pilgrims, investigations could usefully be carried out at ports of departure in the Dutch East Indies and in British India.

The delegate for India informed the Cholera Commission that the programme of research envisaged at the last session was in active progress in India.

The Smallpox and Vaccination Commission noted the progress in connection with research work on the cultivation of vaccine lymph of chick membrane. The attention of administrative medical officers was directed to the possibilities which this vaccine offers. Papers communicated included one on " Culture of Vaccinal Virus in Chick Membrane " by Drs. Pandit and Rao.

A note by Col. L. W. Harrison on proposals for standard courses of treatment of venereal diseases in merchant seamen was discussed and the Commission, while accepting the general principle of standard courses, considered that these may be regarded only as a guide to treatment to be modified according to circumstances. The delegate for India informed the Commission of the " Office " that the Government of India were studying the proposals and would submit their remarks later ; he also stated that his Government were enquiring into the progress made at their various ports for the provision of facilities for treatment in accordance with the requirements of the Brussels Agreement, this information being necessary before ratification would be possible.

The Disinfection Commission considered reports on terminal disinfection as practised in different countries. Opinions on the value of the procedure varied from an expression of complete doubt as to its usefulness to acceptance of its value in certain diseases. It was generally accepted that disinfection during the progress of a case was of distinct value and was in some diseases, *e.g.*, typhoid fever, definitely indicated.

The delegate for India presented a paper on plague investigation in the Cumbum Valley by Dr. George and Major Webster, and a note on c. s. fever in India by Lt.-Col. Russell.

Singapore Bureau, League of Nations.

61. The Bureau was directed by Dr. C. L. Park except for 4 months when Dr. M. Ciuca, Secretary of the Malaria Commission of the League of Nations, officiated.

The Health Committee of the League of Nations, Geneva, at its meeting in May, 1934, emphasised the importance of the work included in the study of rural hygiene and the campaign against social diseases, and requested the Medical Director to give such effect as might be possible to the resolutions adopted by the Advisory Council on these questions.

It also invited the Eastern Bureau to undertake a study of the serum treatment of cerebro-spinal meningitis.

In September, 1934, the delegates for France and India to the 15th Assembly of the League at Geneva also made notable references to the value of the work of the Bureau, especially in regard to the first international course in malariology and the proposed conference on rural hygiene.

During 1934 no full meeting of the Council was held. The 8th Session of the Council held at Singapore on the 8th and 9th February, 1934, was attended by representatives from the Straits Settlements, China, French Indo-China and Japan. The Council passed the following resolutions amongst others :

" The Advisory Council expresses its profound regret that, owing to his retirement from the office of Public Health Commissioner with the Government of India, it will not have the benefit of Major-General Graham's assistance at future meetings. It wishes to place on record its high appreciation of the valuable services which Major-General Graham has rendered to the Council, of which he was the first Chairman, and over whose meetings he presided so ably during the first four years of its existence."

" The Advisory Council having noted with satisfaction that the Government of the Straits Settlements is collaborating fully in the arrangements for the first international malaria course at Singapore, expresses its appreciation of the efforts made by the Principal of the Medical College in arranging the theoretical and laboratory courses of study, and wishes to thank the Director of Public Health Services, Dutch East Indies, the Director of Medical and Health Services, Straits Settlements and the Inspector-General of Medical and Health Services, French Indo-China, for providing facilities for the holding of field courses in their respective countries."

" The Advisory Council, having noted that information has been received from many countries regarding the existing arrangements for protecting the health of the inhabitants of rural areas, considers :—

(*a*) that preliminary informal discussions on this subject should take place during the meeting of the Far Eastern Association of Tropical Medicine at Nanking in October, 1934 ;

(*b*) that the year 1935 would be an appropriate one to arrange for a larger meeting of the Advisory Council, as envisaged by the resolution of the Health Committee in February 1927, and recommends that Rural Hygiene in the Far East should be one of the main subjects for discussion at this meeting."

" The Advisory Council recommends that the Eastern Bureau should undertake a study of the methods which are being applied in various countries of the Far East against social diseases, including in that term tuberculosis and venereal diseases."

"The Advisory Council, having noted the relationship that exists between climatic conditions and the incidence of certain diseases, recommends the Bureau, when preparing charts showing the course of epidemics, to include all available meteorological information."

"The Advisory Council, having noted the valuable information and experience acquired by medical officers of eastern countries who have carried out individual study tours, recommends that this system should be extended as far as financial considerations permit."

"The Advisory Council, being informed that the regulations of certain countries prescribe that all passengers travelling by air must be—

(*a*) vaccinated against smallpox,

(*b*) inoculated twice against cholera, and

(*c*) inoculated against plague—

even if coming from countries where these diseases do not exist, suggests that this question should receive consideration by the appropriate authority with a view to uniformity of practice being obtained."

This year advantage was taken of the presence of several members of the Advisory Council at the Nanking meeting of the F. E. A. T. M. in October, 1934, to discuss the activities of the Bureau since the previous meeting, in particular; the report of the first international course in malariology and the arrangements for the 2nd course; the data on rural hygiene supplied by eastern countries and the arrangements for an eastern rural hygiene conference; the budget proposals for 1936; and the date of the next meeting.

The collection and distribution of *epidemiological intelligence* continued to be the chief function of the Bureau and the weekly fasciculus prepared from reports of 35 countries was issued as usual. The short wave transmission of the wireless message from Saigon worked successfully and is now received in all eastern countries except South Africa and countries along the East African coast, which receive the long wave transmission from Tananarive. The broadcast of the weekly message in clear from Malabar was continued, as also weekly cables to Vladivostok, Canton, Bushire, Basrah, Aden and Victoria (Seychelles).

Infected ships.—The new procedure of notifying infected ships touching Indian ports, as agreed to by the P. H. C. with the Government of India, is that the Bureau will be notified of all such ships, but the responsibility for informing the next or subsequent ports of call will rest with the Bureau where the next port is more than five days' sailing distance from the port of departure. Where the sailing time is less, notification to the next port will be the responsibility of the port health officer of the port of departure.

Only 2 ships were infected with plague; in one case the infection was traced to Colombo and in the other case to Moulmein. Ships infected with cholera numbered 8; although the source of infection was uncertain in most cases, the origin was believed to be in ports in British India. Smallpox was responsible for 37 cases, in 15 of which the infection was traced to Indian ports. Chickenpox was reported on 51 vessels, cerebro-spinal meningitis on 3, measles on 22, scarlet fever on 5, mumps on 2 and leprosy on 1 vessel.

Pilgrim traffic.—The pilgrimage was declared clean by the Sanitary, Maritime and Quarantine Board of Egypt. It was reported however that the number of vibrio carriers among the pilgrims was higher this year than during the last 4 years. Nine agglutinating vibrios and 88 non-agglutinating vibrios were obtained from 5,027 specimens examined at El Tor. All the agglutinating vibrios were classified "Vibrio El Tor."

All pilgrims embarking from ports of British India were medically examined before departure, vaccinated against smallpox and inoculated against

cholera ; those from the Straits Settlements underwent a similar procedure and those from the Netherlands East Indies were, in addition, inoculated against typhoid and dysentery. Dysentery was reported on 6, pneumonia on 7 and chickenpox on 6 vessels on their return voyage.

Disease incidence in ports.—Of the 10 plague infected ports 4 were in British India and included Bassein 50 cases, Bombay 37, Rangoon 27 and Moulmein 1. The ports on the east coast of India again reported the heaviest cholera infection, particularly Calcutta with 3,269 cases, other ports in India and elsewhere recording only sporadic cases.

Although the incidence of smallpox was lower than in 1933, the recorded figures in Calcutta, Madras and Bombay were nevertheless disquieting. Maps Nos. 2, 3 and 4 give the incidence of the major epidemic diseases in Indian ports.

Research programme.—The Director of the Bureau has again summarised some important researches carried out in eastern countries. He mentions the investigations into plague recrudescence and transmission in the Cumbum Valley of Madras Presidency, by George and Webster, which have suggested that rat-fleas remaining in burrows uninhabited by rats might be the off-season reservoir. Girard and Estrade have found in Antananarivo *X cheopis* among the debris from the milling of rice, thus showing the way in which human infection occurred, which had been in doubt owing to the freedom of houses from this species of flea. Hart and Pelikan (U. S. A.) who tried to discover the duration of life of fleas on rat-free ships, have concluded that under the climatic conditions likely to exist on vesssls trading between India and Manila and Japan and Manila, life would not exceed five days, but with high humidity it might extend to 12 days. Cholera researches include the statistical carrier, clinical and other enquiries in Calcutta and the bacteriophage work in Madras, Assam and Calcutta (India) ; and the study of the vibrios of waters in Shanghai (China).

In regard to yellow fever the Director says :—

"The results of the more recent yellow fever protection test surveys carried out in Africa indicate that in the interior of French Equatorial Africa extensive epidemics of the disease have been present within recent years and that there is apparently no barrier against the extension of the disease towards the east."

"A great increase in the percentage of children with positive sera was found in many towns along the main highway towards the east, the maximum being reached at Zemio near the Anglo-Egyptian Soudan. In the latter region positive sera have since been found among adults in several provinces, but among young children only in the Wau District of the province of Bahr-El-Ghazal."

"Positive results with the sera of children under twelve were also obtained at Rumbek (one positive) and Juba (three positives). The results obtained correspond closely with the distribution of the disease that might be expected if the infection spread from the west."

"Confirmation of the results of the biological tests, the specificity of which has in some quarters been questioned, was soon obtained by the occurrence at Wau in June of a case diagnosed as yellow fever, on the basis of clinical symptoms and histological examination of liver sections."

"In Brazil a system of routine post-mortem removal of liver tissue and its microscopical examination is used to supply information concerning typical cases of yellow fever in so-called "silent" endemic foci."

Liaison work.—This was continued by the distribution of documents and by personal contact.

Malaria course.—The first course was held in May and June, 1934, and was attended by 27 doctors from Australia, China, Formosa, India,

Indo-China, Japan, Malaya, New Guinea and Siam. The details of this course were given on page 151 of the Report for 1933.

Study tours.—The Health Section offered fellowships to Prof. Gater, Professor of Biology, Singapore : Dr. Soesilo, Medical Laboratory, Batavia-centrum ; and Dr. Robin, Malaria Officer-in-Charge, Pasteur Institute, Saigon, to enable them to carry out a short period of study of anti-malaria control.

Rural Hygiene.—Preliminary discussions were held during the Nanking Conference of the F. E. A. T. M. in regard to the organisation of the proposed conference on this subject in the East. Provisional agenda were drawn up and it was decided to leave the preparatory work for the conference in the hands of the Eastern Bureau, but the Bureau of the Health Committee which met in November 1934 decided that such preparatory work could best be carried out by sending to eastern countries a group of rapporteurs comprising men of international standing in public health who should, if possible, have had experience of rural hygiene in eastern and other countries. It was also decided not to hold this conference before the later months of 1936.

Health Section of the League, Geneva.

62. The new Health Committee, appointed by the League Council on 17th January, 1934, met from May 11th to 16th. Lt.-Col. A. J. H. Russell, I.M.S., was unable to attend.

Dr. Madsen was re-elected President.

In view of the additional responsibility falling on the *per interim* advisory bureau by the fact that the Committee now holds only one session a year, it was decided to increase the number of elected vice-presidents from 3 to 4 and, excluding Sir George Buchanan, Vice-President, *ex-officio*, Surgeon General Cumming, Prof. Husamettin Bey and Drs. Jitta and Lutrario were appointed. The Darling Foundation Prize was awarded to Col. S. P. James of the British Ministry of Health.. The Committee expressed its gratitude for the continued financial aid from the Rockefeller Foundation (100,000 dollars), also for the grant of £5,000 by the Millbank Memorial Fund for the work of the Health Organisation on nutrition and biological standardisation.

The quarterly, instead of bi-monthly publication of the Epidemiological Report, has necessitated the amplification of the " Weekly Record " which is now the principal channel for the rapid transmission of intelligence on the movement and prevalence of disease. The Committee decided to concentrate on the nomenclature of causes of death in view of the next decennial revision of the International list of causes of death which is not altogether suited to the requirements of tropical countries and which only a few countries have adopted. The preparation of an international list of causes of sickness was also contemplated.

Owing to the present economic depression, the Committee felt compelled to reduce the scope of liaison with health administrations but with greater concentration and more specialisation. The scope of the " reporting committees " was extended to include studies of the epidemiology of tuberculosis, of malnutrition as a factor in tuberculosis mortality, of the age at which tuberculosis is contracted in different communities, of the relation between the general and tuberculosis mortality and nutrition, housing, etc., and of methods for calculating infant and child mortality according to age-groups to establish reliable statistics among children vaccinated with B. C. G.

Discussions on the necessity of an enquiry into the epidemiology of syphilis led to the decision that Dr. Madsen should prepare a note on the experience of the Scandinavian countries and communicate it to his Spanish, United Kingdom and Netherlands colleagues.

The resolution adopted by the Committee on medical education and the training of medical assistants was as follows :—

" The Health Committee considers that the Health Section should include in its programme the collection of information on this subject, utilising the Singapore Bureau in the case of Eastern countries.

" The object is to obtain and present information as regards the arrangements made in particular countries which may be of service to the administrations of other countries with similar problems. The Health Section after obtaining such information may consider it desirable to present any resumes or observations which it considers useful for the purpose in view.

" This enquiry could, without difficulty, be made parallel to and be co-ordinated with similar enquiries carried out independently. For example, the enquiry should wherever possible, take into account similar studies which have been made by individual colonies themselves or by the country on which those colonies depend and also any relevant communications made to the " Office " International d'Hygiene Publique."

The permanent activities of the League arise very largely out of conventional obligations and the undertaking of certain essential tasks, such as that of epidemiological service and the technical commissions. The temporary activities, owing to economic depression, continued to be restricted to matters of " widespread interest and urgent need."

The proposal to enlarge the Commission on Biological Standardisation was approved. As regards the activities of the Malaria Commission, the Committee adopted the following 4 resolutions.

(1) " The Health Committee,

" In view of the success of the International Malaria Course held in the Far East in 1934;

" Decides that the time has come to consider the advisability of organising a similar course for certain Latin-American countries, taking into account the work accomplished by American malariologists and the need of collaboration with existing institutes :

" Entrusts the study of this question to the Health Section and, if the Section finds that the matter is urgent, invites the Bureau, in agreement with the Chairman of the Commission, to take all measures necessary for the organisation of this course."

" The Health Committee,

(2) " Having noted the therapeutic experiments carried out with totaquina, and having studied Dr. William Fletcher's reports thereon ;

" Considers that totaquina seems able to fulfil the purpose for which it was intended, since, having regard to its efficacy—equal to or only slightly less than that of quinine—facility of preparation and cost price, its use would enable malaria treatment to be extended over a wider field ;

" Recommends that the report, together with an introductory note, be distributed to Health administrations in malarial countries, and

" Requests the Health Section to assist health administrations who wish to employ this remedy in the treatment of malaria and to hold itself at the disposal of any institute which may desire to continue this research work."

(3) " The Health Committee,

" Noting that the Study Committee as set up in 1930 contained too many members to be able to meet often ;

" Decides not to renew this Committee

" It approved the list of members of the Malaria Commission submitted by its President."

(4) "The Health Committee,

"Hope that, as the majority of the members will be in Madrid when the next Congress on Malariology is held, it will be possible to take the opportunity of holding a meeting of the Malaria Commission:

"Recommends that the Chairman of the Commission shall be its official representative at this Congress."

The Committee decided to recommend that the collaboration of the Health Organisation with the Government of China should be continued along present lines; also to continue the investigations regarding comparative tests, in certain selected institutes, with anti-rabic vaccines killed by carbolic acid and ether, and regarding the plurality of strains of street and fixed virus and the rabicidal action of the serum of man and animals during and after immunisation. It was also decided to ask the Advisory Council of the Eastern Bureau to collect information regarding the efficacy of anti-meningitis serum in the Far East. The Committee further approved of the question of prevention of trachoma being included in the agenda of an early session.

League health commissions were at work on biological standardisation, malaria, opium, tuberculosis syphilis and cancer. The Commission on Biological Standardisation which was established in 1921 continued to collaborate with the laboratories of various countries and has adopted international standards and units for a series of therapeutic sera. In accordance with the recommendation of the first International Conference for the Standardisation of the vitamins held in London in June, 1931, a further conference was held in London in June 1934 to review progress and to reconsider standards provisionally adopted in the light of the experience gained. The Commission met under the Chairmanship of Dr. Madsen at Copenhagan in September 1934 and adopted standard preparations and international units for the following new sera, *viz.*, gas-gangrene anti-toxins (vibrion septique and oedematiens), anti-pneumococcus sera of types I and II and staphylococcus anti-toxin. The Bureau's report of November 27th 1934, contained the following paragraph;—

"While the 24 standard preparations and international units so far established by the Commission have been adopted in a large number of countries, their use is still far from general. The Bureau accordingly considers that the time has come to convene, for the end of 1935, an inter-governmental conference at which countries will be represented by the Directors of their official biological control institutes. The Conference will be called upon to confirm the results of the Commissions work during the last 12 years."

The activities of the Malaria Commission which was set up in 1924 are based on a programme of work adopted in November 1933, which included:— Investigations into biological properties of different strains of parasites: efficacy of treatment by synthetic remedies: and the possible relation between the geographical distribution of sub-species of *A. maculipennis* and malaria. The Commission continued to investigate the therapeutic value of totaquina and of recently developed synthetic drugs, such as plasmoquine and atebrin. In October 1934, the President of the Health Committee and the Chairman of the Malaria Commission met the experts in charge of experimental work for appraising the efficacy of the new synthetic drugs as compared with quinine in the treatment and prevention of malaria. A common programme was established for the prosecution of this work. In order to place at the disposal of doctors in the far east the advantage of specialised training, an international course in malariology was organised at Singapore with field work in the Netherlands Indies and Malay States. Another very valuable course for European malariologists was held under the auspices of the Commission at the Institute of Malariology at Rome.

To study the relation between the geographical distribution of *A. maculipennis* and malaria a committee of seven, including Sir Rickard Christophers and Col. James, was convened in Rome in August 1934, and the outcome of their discussion was a brief guide to the varieties of *A. maculipennis* which also gives an " identification key " showing the different characters of 5 varieties of *maculipennis* and of one closely allied species.

The opium commission has not only carried out all the work entrusted to it by international conventions but has also established a standard method of determining the morphine content of raw opium.

The enquiry into the treatment of syphilis involving a survey of 25,000 cases in selected clinics in 5 countries has been completed and has led to the establishment of certain principles which should govern the treatment of this disease, while two plans of treatment have been formulated which should give satisfactory results in ordinary cases of early syphilis.

Technical co-operation with various health administrations for specific health purposes was continued as follows :—

(*a*) With the National Chinese Government at Nanking on health administration. The technical agent appointed by the League submitted his first general report in May, 1934.

(*b*) With the Hellenic Government in the reorganisation of its public health service. The plan provided for the organisation of a permanent health service whose work would extend progressively in the period of 1931-35 to all the prefectures of Greece, and which would work under the technical direction of a health centre at Athens.

(*c*) With the Roumanian Government in a study of pellagra as an index of malnutrition in certain groups of the population. Recent researches have shown that there is every prospect of preventing pellagra among a population fed on maize, provided a portion of the maize is replaced by whole wheat.

(*d*) With the Czechoslovakian Government in respect of (i) continuation courses for health officers, courses in hygiene for medical practitioners and propaganda to instruct the population in the rudiments of hygiene ; (ii) local sanitation ; and (iii) co-ordination of the health work of public and private institutions.

In accordance with a recommendation adopted by the 1931 European Conference on Rural Hygiene a series of studies has been continued by institutes and schools of hygiene in various countries on the following subjects :

(i) Cost and efficiency of various types of rural health services (Spain, Hungary and Czechoslovakia);

(ii) epidemiology of typhoid fever in rural districts (Spain, France, Hungary, Poland, Czechoslovakia and Yugoslavia) ;

(iii) improvement in methods of storing manure and in particular, methods of protection against flies (Denmark, Spain, France, Poland) ;

(iv) milk supply (Spain, France, Poland, Czechoslovakia, Yugoslavia) ; and

(v) methods of analysing water and sewage (Poland).

The International centre for the study of leprosy was officially inaugurated in April, 1934, at Oswaldo Cruz Institute, Brazil.

The Indian Delegation to the 15th (Ordinary) Session of the Assembly of League of Nations.

63. The Delegation consisted of (1) His Highness the Right Honourable the Agha Khan, G.C.S.I., G.C.I.E., G.C.V.O., leader of the Delegation, (2) Sir Denys Bray, K.C.S.I., K.C.I.E., C.B.E. (Member of the Council of India) and (3) Sir V. T. Krishnama Chari, C.I.E., (Diwan of Baroda). Sir Homi Mehta, a member of the Council of State acted as substitute delegate.

In regard to the work of the Health Organisation of the League the Delegation reported as follows :—

" A larger number of delegates took part in the discussion in the Second Committee, including the representatives of all the countries with which the Health Organisation is directly collaborating. These, while giving the Committee detailed and first hand information, were unanimous in expressing their appreciation of the great service which the Health Organisation was rendering to their countries.

" The delegates of France and Poland emphasised the close relationship between health and public economy. The representative of Italy and Mexico urged the importance of large scale public works to combat unemployment, insisting that public works in the field of hygiene should be given priority. The delegate of Mexico recalled the resolutions already adopted by international bodies, as well as the work undertaken by several Governments, and suggested that the League of Nations and International Labour Office should study all measures taken to protect public health by a policy of public works ".

"The delegates of Denmark, France, Hungary and Venezuela emphasised the valuable work which the Health Organisation is carrying on in the field of nutrition, the delegate of Venezuela pointing out, in this connection, the desirability of enquiring into the effects of manufactured food products on health, while the delegates of France and Hungary considered that enquiries should be made into the possibilities of extending the consumption of wheat to under-nourished populations. Many of these delegates referred to the value of the enquiry into the possible effects of the economic depression on public health, and stressed the importance of housing in this connection. It was considered that the Health Organisation must continue to deal with this question even after the gravity of the present economic depression has diminished".

" The delegate of India recalled the proposal made by his Government in 1932 to organise a rural hygiene conference for Far-Eastern countries and expressed the hope that the conference would be convened at a not-too distant date."

" A number of delegates, including those of the United Kingdom, Denmark, the Irish Free State and Poland, expressed their appreciation of the collective and individual study-tours, organised under the auspices of the Health Organisation."

" The representative of the Union of South Africa referred to the first Health Conference held in Capetown in December, 1932, and proposed that a Pan-African health conference should be held in Capetown in the autumn of 1935. He pointed out that the Union of South Africa attached great importance to this Conference and would accordingly be glad to afford it every material facility in its power. He thought it would be desirable for the Conference to have the advantage of the co-operation of the Office Internationale d'Hygiene Publique and asked that steps be taken to that effect."

" The delegate of the Irish Free State spoke of the efforts of his Government to reorganise hospital services in the Irish Free State, and expressed the hope that the forthcoming tour arranged by the Health Organisation to study the problem of rural hospitalisation in his country would be of value to all countries faced with similar problems."

The Ninth Congress of the Far Eastern Association of Tropical Medicine (F. E. A. T. M.) held at Nanking, China, from 3rd—8th October, 1934.

64. Lt.-Col. A. J. H. Russell, C.B.E., I. M. S., attended as official delegate of the Government of India. Other Indian delegates were Dr. L. E. Napier from the Calcutta School of Tropical Medicine (Bengal), Lt.-Col. R. E. Wright, I.M.S. (Madras), Dr. C. G. Pandit (Madras), and Dr. (Miss) Alice M. Pannell, Dufferin's Fund. Delegates totalled 81 from India, Hongkong, China, Indo-China, Japan, Formosa, Korea, Kwantung, Macao, Siam, Netherlands Indies, Federated Malay States, Straits Settlements, London (Royal Society of Tropical Medicine), League of Nations, U. S. A. and Philippine Islands.

In the plague section Col. Russell read a paper on "Plague in India". Other interesting papers were by Dr. Wu Lien Teh on plague in China and by Dr. C. Y. Wu on his rat flea survey of Chinese ports.

Much interest was displayed in the subject of cholera, the discussion being opened by the delegate from India who described the work in this country. Dr. J. W. H. Chun dealt with cholera in the Yangtse Valley and Dr. Pollitzer spoke on the cholera vibrio and its variants.

A number of interesting papers were also read at the malaria and kala-azar sections.

Col. Russell spoke by invitation on "Medical Research in India and its practical application" at the International Rotary Club lunch giving a brief outline of the origin of the Indian Research Fund Association, its finance and control, and the results achieved.

During the Congress, India and its delegates had more than generous notice and treatment and there was expressed a continuous desire to learn what is being done in India in regard to medical and public health matters.

The resolutions of the Congress are given below:—

Plague.

"I. Whereas at the Eighth Congress held in Bangkok 1930 a resolution was passed strongly recommending rat-proofing of vessels as a practical means for preventing the spread of bubonic plague, and

"Whereas the value of this method has been amply demonstrated as a means of reducing and keeping rat-population of vessels to a minimum.

"Now therefore be it resolved:—

(*a*) To bring to the attention of all the constituent Governments the urgent advisability of adopting practical measures for the rat-proofing of vessels; and

(*b*) That serious attention be given to the question of how far similar methods could be employed to keep railway systems free from rat infestation.

"II. Be it resolved that in addition to rats and their fleas due attention be paid to other rodents and fleas, particularly *pulex irritans* capable of spreading infection".

Cholera.

"I. This Congress, having discussed the question of "carriers" of cholera, is of opinion that further investigation is desirable and recommends that such investigation be carried out in the countries of the Far East as and when opportunities arise.

"II. This Congress, having discussed the question of the protection conferred by the anti-cholera vaccine, is of the opinion that further statistically controlled field tests be carried out especially in those countries where such controlled tests have not yet been done.

"III. This Congress, having discussed the question of the relationship between the cholera vibrio and allied vibrios and their variants, is of the opinion that further study of this problem is desirable and that as far as possible the workers on this subject in different countries should exchange available information in order to correlate the results obtainable by the different methods employed.

"IV. This Congress proposes that further field and statistical work be carried out in order to obtain more exact information than at present available regarding the epidemic and endemic areas for cholera in the Far East."

Malaria.

"A resolution urging the need for co-operative international investigations of the bio-chemical changes occurring in the breeding places of anopheline mosquitoes, with a view to studying the effect of such changes in limiting the transmission of malaria."

"The Ninth Congress of the Far Eastern Association of Tropical Medicine recognizing the pressing need for co-operative investigations in the problems of malaria control wishes, in particular to emphasize and direct attention to the fundamental importance in malarial epidemiology of studying bio-chemical changes occurring in the breeding places of anopheline mosquitoes.

"This Congress considers that advances of practical utility in the control of malaria might be made if the data obtained by workers in the countries of the Far East were made comparable.

"It is resolved, therefore, "that, with the consent of the Governments concerned such investigations, conducted in various countries, be co-ordinated through the appointment of a joint committee of chemists and malariologists resident in these countries."

"It is recommended that this Committee should be invited to formulate the general lines upon which bio-chemical investigations shall proceed, and that they should be asked to report to the Director of the League of Nations Far Eastern Bureau concerning the principles and methods of study which are likely to be most profitable and from time to time concerning the results achieved from this application.

"The following experts shall be requested to serve as honorary members of this Committee.

"(1) Dr. R. Soesilo, Chief of Malaria Survey of Netherlands Indies and (Miss) Dr. C. Hyman representing the Netherlands East Indies.

"(2) Dr. H. G. Morin, Director, du Service du Paludisme en Indochine, Institute Pasteur de Saigon and Dr. Bader, Chemist of Malaria Service representing French Indo-China.

"(3) Dr. A. Neave Kingsbury, Director, Institute for Medical Research, Kuala Lumpur and Dr. J. L. Rosedale, Professor of Bio-chemistry, College of Medicine, Singapore representing British Malaya.

"Furthermore, this Committee shall be empowered to co-opt other workers experienced in this field of study so as to extend this investigation throughout the countries of the Far East."

Nutrition.

"That in view of the importance of the food-factor in disease, a section on Food Problems be added to the programme of the next Congress."

Sanitary Measures.

"That a section on sanitary measures with reference to water supplies and sewage and garbage disposal be added to the programme of the next Congress."

Port Quarantine.

65. When the revised International Sanitary Convention was signed in Paris on the 21st June, 1926, the Government of India was one of the high contracting parties. Unfortunately Government have not yet seen their way to ratify this Convention. This means that India is not bound by the international obligations imposed under this convention nor are other countries so bound in regard to India. One of the obstacles to ratification has been the archaic set of port health rules in operation in this country. The Government of India decided this year to revise these rules which are framed under Section 6(1)(*p*) of the Indian Ports Act, 1908, and Lt.-Col. G. G. Jolly, C.I.E., I.M.S., has since been placed on special duty for the purpose and has completed a revision to bring these rules into line with the Convention and with the present day needs of India. The revised rules have been circulated to local Governments and their adoption should render easy the ratification of the Convention.

Under the Devolution rules of 1920 port quarantine and marine hospitals form a central subject, but the maritime local Governments have been acting as agents of the Government of India and Port Health Officers work under their control. This position is not satisfactory. The ultimate responsibility rests with the Government of India, but the interests of the central and local Governments in matters of port health work are not necessarily always identical. It is also desirable that Port Health Officers should be in close and direct touch with the Public Health Commissioner and under his technical advice.

The imminent change in the constitution of India would appear to be a suitable occasion to transfer the entire control of port quarantine and hospitals connected therewith to the Government of India.

It would also be a suitable opportunity to introduce the system of Port Sanitary Authorities, a detailed scheme for which was drawn up by Mr. Clayton, I.C.S. in 1930. His scheme, as approved by the Government of India, has been circulated to local Governments. It envisages Port Sanitary Authorities composed of respresentatives of the Government of India, the local Government, Port Trust, and Municipal and other interests, the total not exceeding 10 or 12 at most. The field of activity of these Authorities would include the sanitation of the port area—an important part of which would be mosquito control and anti-rat measures—the provision of a safe water supply for ships, and measures for the prevention of the spread of communicable diseases through the port. The Port Health Officer would be the executive officer of the Port Sanitary Authority, but would remain in close touch with the Public Health Commissioner with the Government of India.

There is at present no uniformity in procedure in the various maritime provinces regarding the declaration of ports as infected with or free from epidemic diseases. While the Government of India have appreciated the desirability of laying down a uniform procedure for the guidance of maritime local Governments, they have been faced with difficulties in determining the conditions in respect of each disease which should lead to the declaration of a port as " infected " or " free ".

Article 10 of the I. S. C., 1926, implies that a port should be declared as infected on the occurrence of the first non-imported case of plague or yellow fever ; so far as cholera is concerned, the implication is that a port should be regarded as infected only when the case of cholera forms a "foyer", *i.e.*, when the occurrence of new cases outside the immediate surroundings of the first case prove that the spread of the disease had not been limited to the place where it began. In regard to typhus and smallpox the Article in question implies that a port should be declared as infected when the disease appears in an epidemic form.

The Public Health Commissioner with the Government of India recommended that in the case of plague, cholera, yellow fever, smallpox and typhus, a port may be deemed free from infection if no case has occurred within the previous four weeks, but the " Office International " at Paris was not in favour of a declaration regarding freedom from infection being founded solely on the fact that a certain period of time has elapsed since the last case of illness.

The Bombay Health Board declares Bombay as epidemically infected with smallpox when 52 cases with 30 deaths have been reported in any one week ; when the numbers fall lower than these it is declared free. The similar provision regarding plague is that when human cases and deaths from this disease reach 34 and 30, respectively, in any one week, the port is declared infected. In this connection it should be remembered that human plague as a source of infection is of little or no importance except as an indication of the existence of a rat epizootic. Similar standards have been adopted at other ports. Further a cholera " foyer " cannot justifiably be associated with the term " epidemic ", for it implies the possibility rather than the fact of an epidemic, *i.e.*, the pre-epidemic or potential epidemic state or the proof that " the spread of the disease has not been limited to the place where it began ". This important question of introducing uniformity in these standards is at present being further examined in consultation with the Office International at Paris.

Although the International Sanitary Convention, 1926, has not so far been ratified, the Government of India agreed, as long ago as June, 1927, that they would transmit, through the Singapore Bureau of the League of Nations, the epidemiological and other communications provided for in Articles 1, 2, 3, 4, 6, 12 and 16 of the Convention. They also agreed to send direct to the Office International the information required under Articles 9, 14, 28, 50 and 57 as well as that relating to special agreements mentioned in Article 21. Action on these lines is being continued.

The Ports of Bombay, Calcutta and Rangoon are at present the only ports authorised to issue the deratisation and deratisation exemption certificates referred to in Article 28 of the I. S. C. of 1926. The Port of Karachi, formerly included, was excluded this year. The question of its restoration to the list has been raised but has not been decided yet.

As from 1st January, 1934, the system of sending wireless quarantine messages from ships, prior to their arrival, and according to the International Code, was introduced.

66. Table V (*i*) below gives the mortality statistics of the major ports according to the principal diseases :

TABLE V (*i*).

	Bombay.		Calcutta.		Madras.		Rangoon.		Karachi.	
	Deaths.	Rate p.m.	Deaths.	Rate p.m.	Deaths.	Rate p.m.	Deaths.	Rate p.m.	Deaths.	Rate. p.m.
Total .	27,370	23·6	34,356	28·7	23,659	34·2	9,475	23·7	5,376	21·7
Smallpox . .	152	0·1	1,074	0·9	131	0·2	75	0·2	48	0·2
Cholera . .	13	...	1,360	1·1	166	0·3	4	...	...	...
Plague . .	31	...	...	...	...	...	27	0·1	...	...
Enteric fever .	240	0·2	963	0·8	145	0·2	46	0·1	29	0·1
Malaria . .	101	0·1	714	0·6	193	0·3	99	0·3	36	0·1
Kala-azar . .	...	...	210	0·2	16	...	7	...	...	...
C. S. fever . .	...	...	...	...	1	...	4	...	...	...
Influenza . .	98	0·1	597	0·5	10	...	9	...	1	...
Measles . .	161	0·1	145	0·1	7	...	1	...	11	...
Dysentery . .	321	0·3	1,672	1·4	1,210	1·8	205	0·5	77	0·3
Tuberculosis .	1,856	1·6	2,757	2·3	1,122	1·7	831	2·1	490	2·0
Other causes ..	24,377	21·1	24,864	20·8	20,658	29·7	8,167	20·4	4,684	19·0

Table V(*ii*) gives particulars of anti-rat operations within the port areas excluding operations on ships.

TABLE V (*ii*).

	Destroyed.	Examined.	Found infected with plague.
Calcutta	5,818	613	*Nil*
Chittagong	*Nil*	162	*Nil*
Karachi	2,514	395	*Nil*
Madras	*Nil*	*Nil*	*Nil*
Bombay	734,361	263,653	34
Rangoon	6,645	2,683	*Nil*
Cochin	16,292	327	159
Bassein	4,000	1,627	16
Moulmein	6,163	622	*Nil*

Fumigation of ships.—Sulphur dioxide fumigation by means of the Clayton apparatus remains the method in operation in Bombay, Calcutta and Rangoon ports. The question of the introduction of cyanide fumigation in Bombay Port has been under examination, but no decision has yet been taken. The method is obviously a dangerous one for adoption in Indian ports and would require very careful supervision.

Table V (*iii*) gives the number of deratisation certificates and deratisation exemption certificates issued at the three ports—Bombay, Calcutta and Rangoon—authorised for the purpose.

TABLE V (*iii*).

	Deratisation certificates.	Deratisation exemption certificates.
Bombay	57	16
Calcutta	41	20
Rangoon	44	15

Port of Bombay.

67. Lt.-Col. C. L. Bilderbeck, I.M.S., was in charge of the Port Health Department.

Incoming vessels.—Inspections were made of 116 vessels carrying 12,448 members of crews and 23,852 passengers and pilgrims. The following cases of communicable diseases were dealt with on arrival of vessels: measles 28, chickenpox 16, pneumonia and chigger 4 each and one case each of plague, smallpox, influenza, scarlet fever and typhus fever.

Outgoing vessels.—Altogether 701 vessels carrying 51,101 members of crews and 46,420 passengers were inspected. These figures are exclusive of troops who were examined by the military embarkation staff. In accordance with Government Notification, General Department, No. 1713, dated the 15th March, 1917, medical examination and disinfection of clothing and bedding were carried out on (*a*) 25,537 Asiatic and African members of crews, (*b*) 11,299 deck passengers (not provided with cabin accommodation) and (*c*) 4,169 pilgrims.

During the year 50 per cent. of the total British and foreign crews were found to be either unvaccinated or insufficiently protected against smallpox.

Among the passengers and crews of outgoing vessels, 10 cases of infectious disease were detected and these together with 15 contacts were prohibited from embarking.

Red Sea pilgrim traffic—outward.—All prilgrims were medically inspected, vaccinated against smallpox and inoculated against cholera before embarking. Their clothing and bedding in cases where there might have been exposure to infection were disinfected. Altogether 4,169 pilgrims in 8 vessels sailed for Jeddah between the 23rd November, 1933, and 7th March, 1934.

Inward.—Ten vessels, carrying 4,250 pilgrims from Jeddah, were inspected. Eighteen deaths occurred during the voyage and 6 cases of infectious disease were found on board 3 vessels on arrival.

General—disinfection.—Four vessels which became infected while lying in the harbour were disinfected. Under Article 28 of the I. S. C., 57 ships were

deratised by sulphur fumigation and issued with deratisation certificates while 16 were granted deratisation exemption certificates. In addition, 8 pilgrim ships were fumigated. The disinfection station dealt with 3,076 bundles of clothing and bedding received from different hospitals. Eight deaths from accidents occurred on board the vessels in the harbour or docks.

Rats and fleas.—Tables V (*iv*) and (*v*) summarise the anti-rat operations carried out in the port area on board ships and in the city of Bombay.

TABLE V (*iv*).

	Rats.						Ships deratised by	
	Killed.		Examined.		Plague infected.		Fumigation.	Fumigation and trapping.
	Town.	Docks.	Town.	Docks.	Town.	Docks.		
Total	**727,815**	**6,546**	**257,107**	**6,546**	**34**	...	...	**57**
January	70,727	480	26,963	480	...	...	...	4
February	61,807	333	23,211	333	11	...	...	6
March	60,035	487	18,039	487	16	...	...	1
April	53,413	583	13,551	583	1	...	...	1
May	58,038	542	21,532	542	3	...	...	2
June	52,706	528	17,126	528	2	...	...	1
July	49,144	581	16,492	581	...	...	...	1
August	53,735	568	19,564	568	...	...	...	4
September	57,427	530	19,190	530	...	...	...	9
October	72,928	742	28,622	742	1	...	...	13
November	68,155	548	25,996	548	...	...	...	7
December	69,700	624	26,821	624	...	...	...	8

TABLE V (*v*)

	Rats on boardships.					Certificates issued.			
						Deratisation.		Exemption.	
	No. of ships.	Killed by trapping.	Killed by fumigation.	Examined.	Found infected.	Loaded.	Unloaded.	Loaded.	Unloaded.
Total	**60**	**65**	**1,937**	**1,128**	...	...	**57**	**3**	**13**
January	3	6	54	29	...	...	4	1*	...
February	6	7	37	29	...	...	6	1R	3
March	1	1	1	...	...	...	1	...	...
April	1	...	1	...	...	...	1	1S	1
May	3	12	65	76	...	...	2	...	1
June	4	6	232	18	...	...	1	...	4
July	1	1	16	17	...	...	1	...	...
August	4	5	105	67	...	...	4	...	...
September	9	2	550	317	...	...	9	...	...
October	14	9	445	295	...	...	13	...	2@
November	6	2	242	159	...	...	7	...	..
December	8	14	189	121	...	...	8	...	2

* 8,050 tons of oil.
R 8,256 tons of fuel oil.
S 6,845 tons of Deisal oil.
@ Partly loaded with oil.

Port sanitation.—The sanitary state of the harbour and of the *bunders* and docks generally was reported as good by the Port Health Officer.

Other matters.—Under Government of India orders, 413 inspections of the food supplies for lascar crews were made, the principal defects found being in *ghee*, 34 samples of which, out of 116, were condemned.

Port of Karachi.

68. *Staff and administration.*—Dr. B. F. Khambata, D.P.H., was Port Health Officer.

Incoming vessels.—During the year, 53 vessels including 7 pilgrim ships entered the port under the "Quarantine" flag. Necessary measures were carried out in respect of each. Of these vessels 48 arrived from the Red Sea and European and South African ports, one from the Persian Gulf ports and 4 from various Indian ports. No cases of plague, cholera, mumps, beri-beri, scarlet fever, yellow fever, jigger and sleeping sickness were recorded. Two cases of smallpox were detected, one among deck passengers on the S. S. "Varsova" and the other, a case of modified smallpox, on the pilgrim ship "Jehangir". Other diseases included 6 cases of chickenpox, 6 of measles and 1 of cerebrospinal fever.

Outgoing vessels.—These numbered 721 with 64,707 persons on board. Of these vessels 409 were country boats carrying 5,048 persons.

Pilgrim traffic.—(*a*) *Outgoing vessels.*—Only one ship the S. S. "Rahmani" carrying 1,671 pilgrims sailed direct from Karachi, but 7 others which arrived from Bombay embarked 3,812 pilgrims at this port.

(*b*) *Incoming vessels.*—In all 7 ships arrived with 8,990 pilgrims, of whom 6,402 disembarked at this port, the others continuing their voyage to Bombay. During the voyage 29 deaths occurred from non-communicable diseases.

General—Rats and fleas.—Altogether 2,514 rats were destroyed. Among 395 examined in the Government Chemico-Bacteriological Laboratory, no plague infection was found.

Port sanitation.—The sanitary condition of the harbour was satisfactory.

Other matters.—Provisions and stores for the use of the Asiatic crews of 39 vessels were inspected as required under Section 91 of the Indian Merchant Shipping Act, 1923. Of 197 samples of *ghee* analysed, 69 were condemned.

Air traffic.—The Port Health Officer held collateral charge of Karachi aircraft during the year. In all 183 Bills of Health were granted to aircraft and 1,271 persons including passengers and crews leaving the port were medically inspected.

The companies operating planes from and to Karachi were (i) the Imperial Airways, Ltd., (ii) the Campagnie Air Orient Company (Fr.) and (iii) the Royal Dutch Air Mail Company. In addition, 13 British and 6 other private planes used the airport.

Port of Calcutta.

69. *Staff and administration.*—Military Assistant Surgeon Lt. Campbell, I.M.D., continued to hold temporary charge of this port. The other port health staff included three Assistant Port Health Officers, one medical inspectress, one sanitary inspector and one fumigation inspector.

Incoming vessels.—Since the discontinuance of routine inspection of all incoming ships from October, 1931, only those reported to be infected or "suspected" have been inspected by the Port Health Department. Therefore, of the 1,212 vessels entering this port during 1934 only 13 having 748 crews (95 European and 653 Asiatic) and 922 passengers on board underwent inspection. Six vessels having infectious diseases on board were disinfected. Admissions to and deaths in hospitals among European seamen were 430 and 8, respectively; the admissions included dysentery 31, influenza 20, diarrhœa 9, malaria 7, enteric fever 5, sunstroke 3, scurvy 1, and other causes 354 among whom all the 8 deaths occurred. Among Asiatic seamen there were 101 admissions and 7 deaths as follows:—Cholera 18 admissions with 3 deaths, enteric fever 2 fatal cases, malaria 3 non-fatal cases, influenza 2, diarrhœa and dysentery 1 each and other causes 74 with 2 deaths. Admissions for venereal diseases among European seamen numbered 20.

Outgoing vessels.—Of 1,210 vessels which left this port, only 874 with 66,908 members of crews and 2,405 passengers proceeding to ports beyond British India were inspected for the purpose of granting Bills of Health. As the town and port were free from plague, routine disinfection of clothing and bedding of Asiatic and African members of crews and of third class deck passengers was not enforced.

At the request of the shipping agents, 644 deck passengers on 40 ships proceeding to the Straits were vaccinated by the Port Health Department.

Pilgrim traffic.—Only one ship the S. S. "Alavi" with 286 pilgrims on board left for the Hedjaz. Before embarkation, all pilgrims were vaccinated against smallpox and inoculated against cholera.

General—Disinfection and fumigation.—The effects of crews and deck passengers continued to be disinfected at the four disinfecting sheds of the Port Health Department. Seventeen seagoing vessels, and 40 other craft were disinfected and 41 seagoing vessels were fumigated with the Clayton apparatus.

Rats and fleas.—Forty one deratisation certificates and 20 exemption certificates were issued.

Of 753 rats caught in the port and examined at the Bengal Public Health Laboratory, none were found to be plague infected.

Port sanitation.—The sanitation of the Kidderpore docks was as usual looked after by the Port Commissioners. The port sanitary inspector supervised the cleanliness of cargo boats plying in the river, also conservancy arrangements in the bathing and burning *ghats* within the limits of the port.

Other matters.—The municipal filtered water supplied to the shipping was satisfactory both in quantity and quality.

Port of Madras.

70. *Staff and administration.*—Madras is only a port of call, except for vessels going to Rangoon, Singapore, etc. An A. D. P. H. acts as part time Port Health Officer. The other staff comprised a nurse for the examination of female passengers and a sub-assistant surgeon.

Incoming vessels.—These numbered 739 and carried on board 65,490 crew and 55,077 passengers. One case each of measles, chickenpox and mumps were landed and sent to the Corporation infectious diseases hospitals.

Outgoing vessels.—Altogether 707 such vessels carrying 60,571 crew and 76,164 passengers were inspected and granted Bills of Health. Rules for

the prevention of the spread of smallpox from ports in the Madras Presidency to foreign countries were issued.

Disinfection of bedding and clothing of deck passengers and crew was carried out at the discretion of the Port Health Officer.

Rats and fleas.—No deaths among rats were found on any vessels that entered the harbour.

Port of Rangoon.

71. *Staff.*—Dr. J. A. Anklesaria, D.P.H., was the Port Health Officer.

Incoming vessels.—A total of 875 vessels from Indian and 376 from foreign ports, carrying 117, 896 members of crew and 241, 204 passengers were inspected. Thirty cases of infectious disease were reported on 15 vessels—chickenpox 23, measles 3, cholera and smallpox 2 each. Except for one case of cholera landed at a previous port of call and one of measles removed by the military authorities, all were segregated and treated in the contagious diseases hospital, Rangoon. Further 15 unreported cases of chickenpox, 6 of measles and 2 of smallpox were detected on 18 vessels during inspection and removed to the contagious diseases hospital. Nineteen lepers were also discovered on vessels and except for one who was on his way to an asylum, all were allowed to proceed to their homes. A sharp outbreak of beri-beri was reported among the Asiatic crew of a vessel in December, 1934. Sixteen cases showing acute symptoms were removed to hospital; 2 died. Necessary measures for the prevention of further cases were taken. Twelve deaths from non-infectious diseases were also reported on 12 vessels.

Of a total of 246,593 passengers examined under the Burma Vaccination Act, 97,319 were found protected and 149,274 were vaccinated. The effects of 734 members of crew, 1,424 passengers, and 112 baggage coolies were disinfected.

Outgoing vessels.—These numbered 517. The effect of 35,394 members of Asiatic and African crews and 15,687 deck passengers were disinfected and 10,057 European members of crew and 4,071 saloon passengers were inspected. Vaccinations totalled 117 of members of crew and 291 of passengers. Baggage coolies numbering 3,690 were inspected and their clothes and uniforms disinfected prior to handling passengers' baggage.

Of 3,048 new members of crew inspected prior to signing ships articles, 3,008 were passed fit.

Five deaths from non-infectious diseases, one case of cholera, 3 of chickenpox, one of mumps and dysentery each were reported on vessels in the harbour.

General—Disinfection and fumigation.—Forty four vessels were fumigated by the Clayton machine and deratisation exemption certificates were issued to 15 vessels.

Rats and fleas.—The total number of rats killed was 6,645 and of 2,683 examined none were found infected. Both rat and human plague was absent in the port area in which 752 burrows were fumigated with cyanogas and 10,685 connecting burrows were blocked.

Port sanitation.—The sanitation of the Port Commissioners' area was maintained at a high standard.

Other matters.—Vaccinations performed amongst the employees of Port Commissioners numbered 2,544. Anti-cholera inoculations of members of crew

numbered 140. The provisions for the Asiatic lascar crews on 241 ships were inspected and of 147 samples examined, 28 of *ghee*, 13 of mustard oil, 5 of rice and one of *dal* were found bad or adulterated.

Port of Aden.

72. *Staff.*—Lt.-Col. E. S. Phipson, I.M.S. continued to act as Port Health Officer.

Incoming and outgoing traffic.—Bills of Health were granted to 1,709 vessels including 1,174 sailing under the British and 535 under foreign flags. Of the total 23 vessels arrived with 28 cases of infectious disease on board of which 16 were chickenpox, 11 measles, and one pneumonia.

Pilgrim traffic.—Only two deaths were reported among the 2,597 passengers on 9 pilgrim ships (British) which called at this port. All were medically examined but were not granted pratique.

Disinfection.—The disinfection stove on Flint Island quarantine station was maintained.

General.—The Port Health Officer continued to act as the inspecting officer of the port under Section 91 of the Indian Merchant Shipping Act, 1923, *vide* Government of India Notification No. 5 M II(4)/33, dated the 26th September, 1931. Medicine chests on one vessel and provisions on 3 were found in an unsatisfactory condition and remedied.

Kamaran Quarantine Station, Red Sea.

73. The civil and general administration of the island is under the Government of India, but the medical administration of the Quarantine Station is under joint Anglo-Dutch control. The pilgrimage of 1933-34 which lasted for 4 months, opened with the arrival of M. S. " Peisandar " from the Dutch East Indies on the 14th November, 1933, and closed with the departure of the S.S. " Rizwani " from India on the 17th March, 1934. Twenty-two vessels of which 19 were British and 3 Dutch, carrying 13,519 pilgrims, passed through Kamaran and were dealt with according to the measures prescribed for " healthy ships under Article XX of the schedule to the Anglo-Dutch Agreement of 1926." Of the pilgrims 9,937 were from British India, 2,465 from the Dutch East Indies, 835 from the Straits Settlements and 282 from the Arabian Coast. No " suspected " or " infected " vessels were reported, but 282 pilgrims were landed for disinfection, etc. No cases of infectious diseases occurred. Cases of ordinary illness were few. There were 6 deaths and 4 births aboard vessels during the whole season.

SECTION VI.

VACCINATION AGAINST SMALLPOX.

A.—British India.

General.

74. In spite of a decrease this year in the number of deaths from smallpox in British India to about four-fifths of the figure for 1933, the number of vaccinations performed has increased by 1,125,859 to a total of 23,269,224. This increase is spread over both primary vaccinations and revaccinations, the number of operations having increased by 209,061 and 916,793, respectively. Increases in the number of operations performed were recorded in most of the provinces, particularly in Madras and Bombay Presidencies. The increase n the former presidency was due to the prevalence of smallpox in epidemic orm and the consequent demand for protection and in the latter to a vigorous campaign of mass vaccination.

Out of 9,288,897 registered infants, only 44 % were successfully protected. Until this exceedingly low percentage is at least doubled there can be little hope of preventing epidemic smallpox in the country. Nearly 96 % of the primary and 46 % of the revaccinations were recorded as successes. Details for each province are given in Table VI(*i*).

TABLE VI (*i*).

		Vaccinations.		Per cent. success.		Cost per successful case.		
		P.	R.	P.	R.	Rs.	A.	P.
British India	1934-35	**10,128,115**	**13,141,109**	**96**	**46**	**0**	**3**	**11**
	1933-34	9,919,054	12,224,316	97	51	0	4	0
N.-W. F. P.	1934-35	**142,543**	**114,192**	**98**	**84**	**0**	**1**	**11**
	1933-34	206,382	141,242	98	84	0	1	6
Punjab	1934-35	**917,582**	**2,195,905**	**99**	**65**	**0**	**3**	**0**
	1933-34	950,385	2,255,971	98	69	0	2	10
Delhi	1934-35	**18,547**	**15,338**	**97**	**63**	**0**	**4**	**10**
	1933-34	16,979	18,958	96	72	0	5	1
U. P.	1934-35	**1,575,704**	**282,025**	**95**	**40**	**0**	**3**	**11**
	1933-34	1,522,517	241,726	96	40	0	4	0
B. & O.	1934-35	**1,089,829**	**777,381**	**99**	**63**	**0**	**0**	**11**
	1933-34	1,065,592	851,134	99	64	0	1	8
Bengal	1934-35	**2,635,546**	**4,260,825**	**86**	**40**	**0**	**1**	**9**
	1933-34	2,532,230	4,107,104	89	43	0	1	9
C. P.	1934-35	**567,399**	**158,289**	**97**	**52**	**0**	**5**	**3**
	1933-34	570,833	117,798	97	53	0	5	7
Bombay	1934-35	**733,844**	**482,991**	**100**	**46**	**0**	**11**	**2**
	1933-34	688,659	301,371	100	53	0	12	9
Madras	1934-35	**1,381,176**	**3,842,744**	**96**	**27**	**0**	**5**	**9**
	1933-34	1,297,829	3,254,926	97	34	0	5	8
Coorg	1934-35	**8,112**	**17,101**	**95**	**64**	**0**	**5**	**3**
	1933-34	7,524	8,053	94	60	0	8	5
Assam	1934-35	**411,785**	**293,151**	**91**	**64**	**0**	**3**	**9**
	1933-34	402,375	304,085	92	61	0	3	9
Burma	1934-35	**621,449**	**697,519**	**96**	**32**	**0**	**9**	**7**
	1933-34	634,233	619,653	97	31	0	10	3
Ajmer-Merwara	1934-35	**24,599**	**3,648**	**96**	**94**	**0**	**4**	**9**
	1933-34	23,516	2,295	95	97	0	5	6

P.—Primary. R.—Revaccinations.

Success rates for the different provinces are given in the graph facing this page.

No cases of post-vaccinal encephalitis were recorded.

Vaccine Institutes and Supply of Vaccine.

75. Glycerinated lymph, manufactured at provincial vaccine institutes continued to be used throughout British India.

Manufacture and despatch.—Supplies of glycerinated chloroform lymph for the N.-W. F. P. were obtained as usual from the Punjab Vaccine Institute and gave good results. In the Punjab, vaccine lymph was prepared, propagated and despatched as in the previous years and the potency of the lymph was, as usual, extremely satisfactory. In other provinces glycerinated lymph prepared at the provincial vaccine institutes was used throughout the provinces and the supply and quality of the lymph were reported to be good.

Yield.—The yields of lymph obtained at the various vaccine depots are shown in the table below in grammes :

	Buffalo calf.	Ox calf.
Punjab	129·4	31·2
U. P.	55·6	23·0
B. & O.	57·2‡	36·2
Bengal	‡	25·9
C. P.	62·3	39·8
Bombay	*	32·8
Madras	18·8‡	26·1
Assam	†	22·6
Burma	447·5	108·1

* No calves were used for vaccine preparation.
† Requisite amount of pulp is collected for seed purposes.
‡ Only a few calves are vaccinated for the regeneration of seed lymph.

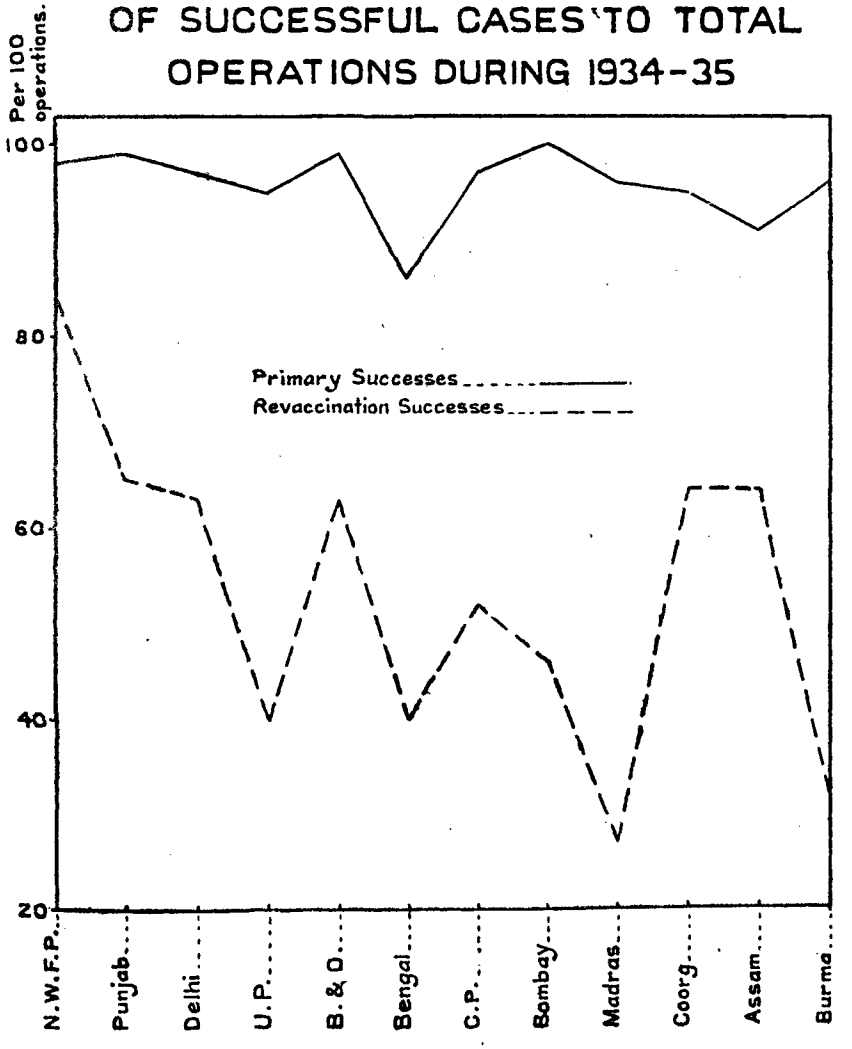
Tests.—In the Punjab, the detection of the presence of chloroform which used to be done by smell was replaced by a more accurate chemical test the details of which have been published. Experimental supply of vaccine lymph in collapsible metal tubes in place of glass tubes was discontinued as it was found that this resulted in considerable wastage of the lymph and consequently higher cost per vaccination. Each brew of vaccine lymph was tested for the presence of pathogenic organisms—both aerobic and anaerobic and its potency was then tested on at least 3 children by primary vaccination. No brew was issued from the institute which did not give a cent per cent. case and insertion success.

In the *U. P.* bacteriological tests were carried out on every sample of vaccine before issue and results obtained showed complete absence of streptococci and gas-producing anaerobes in all samples tested. The number of viable organisms per c.c. of vaccine lymph was less than the prescribed standard of 5,000 in all samples issued. Samples which showed more than 5,000 organisms per c.c. were chloroformed and issued only when subsequent tests showed adequate reduction of organisms. The potency test on rabbits was performed with every batch. Contents from several samples were pooled and then tested on rabbits in various dilutions ranging from 1 in 500 to 1 in 3,000 and the tests indicated that the vaccine was of uniformly good quality. The potency of vaccine was so high that it was possible to dilute it to the strength of 1 in 6 instead of 1 in 5 and such diluted vaccine was used during the cooler months with success. As the depot laboratory is not as yet adequately equipped and the staff provided is also meagre it was not possible to test individual samples separately.

In *Bombay Presidency* the purity and potency of all lymphs were tested as usual.

№ 7

VACCINATION GRAPH SHOWING PERCENTAGES OF SUCCESSFUL CASES TO TOTAL OPERATIONS DURING 1934-35



At the *King Institute, Guindy, Madras*, the practice of mixing several cups and issuing from the mixture to secure uniformity in supply, having been found satisfactory, was continued. As previously, the lymph was subjected to a detailed bacteriological examination both at the time of manufacture and of issue to ensure freedom from pathogenic aerobic and anaerobic bacteria. An additional test for the presence or absence of *B. Pyocyaneus* was introduced.

In *Burma*, the lymph, before issue, is subjected to animal tests for bacteria and to the Calmette-Guerin potency tests on rabbits. Tests on at least three children are done, and the lymph is required to give 100 per cent. success without undue inflammation before issue.

Table VI (*ii*) gives details of the lymph produced and issued from the various provincial vaccine institutes.

TABLE VI (*ii*).

Vaccine Institutes.	Number of doses.	
	Output.	Issues.
N.-W. F. P. Punjab } Lahore	6,422,195	6,690,385
U. P., Patwa Dangar	3,130,625	3,480,987
B. & O., Namkum (Ranchi)	3,748,705	3,459,912
Bengal, Calcutta	6,355,576	7,174,792
C. P., Nagpur	917,220	772,565
Bombay, Belgaum	1,851,175	1,713,630
Madras, Guindy *	7,196,200	4,714,830
Assam, Shillong	863,842	863,842
Burma, Meiktila	2,230,446	1,849,380

* For the period 1st October, 1934, to 30th September, 1935. The figures refer to 2 insertions per case.

Investigations.—Investigations regarding (1) cultivation of vaccinia virus on the chorio-allantoic membrane of chick embryo and (2) the duration of degree of immunity against smallpox by infant vaccination and its relation to the size and number of insertions were carried out at the Punjab Vaccine Institute. In the U. P. the best pH value for the glycerine solution was worked out and Sobernheims test for potency was introduced as a routine measure. At the Vaccine Depot, Namkum, in B. & O., the regeneration of seed vaccine by passage through guinea-pigs was tried but proved unsatisfactory. Regeneration was also tried by passage through rabbits alone with better results. At the Vaccine Institute, Belgaum, investigations into the degree and duration of immunity against smallpox conferred by infant vaccination were carried out. The investigation covered observations on 1,012 cases of infant vaccinations and their revaccinations at varying periods. It was shown that the degree and duration of immunity conferred by infantile vaccination is certainly much shorter than is generally believed. Further experiments were made on the use of Tincture Benzoin Co. as an application after vaccination and its application two or three minutes after the operation is now adopted as a routine in all cases vaccinated in the institute. At the King Institute, Guindy, the following research work with regard to vaccines was done :—

(*i*) *Cultivation of Vaccinia Virus on Chorio-allantoic Membrane of Developing Chick Embryo.*—Experiments initiated at the Institute in 1933 to see if vaccinia virus, which can now be cultivated

in the laboratory either on minced chick-embryo tissue suspended in Tyrode solution, or on the chorio-allantoic membranes of developing chick embryos to avoid entirely the presence of contaminating bacteria, could be manufactured on a large scale and also to ascertain that on such cultivation the characters of the virus had not altered in any way and that in its immunising properties it was at least equal to the calf-vaccine virus now in general use, were continued.

(*ii*) Further investigations were carried out with regard to the effect of clove oil on the virus content of the lymph as issued for use in the field.

(*iii*) Experiments to obtain potent dried lymph were continued and the method described by Dr. Otten of the Government Lymph Establishment, Java, was further investigated.

(*iv*) Attempts were made to modify the Nijland's seed cycle by introducing human passage lymph instead of the rabbit to vaccinate buffalo-calves and experimentally this lymph gave as good a lymph as is obtainable with the routine cycle. The lymph was issued for field use and the results are awaited.

Training.—At the Punjab Vaccine Institute, 6 vaccinators, 115 private individuals and 38 students of the Ayurvedic and Unani Tibbia Colleges, Lahore, were trained in the technique of vaccination, principles of elementary hygiene and the methods of preparation of vaccine lymph. In addition one sanitary inspector, 41 students of the sanitary inspector's class, 10 lady health visitors and 72 students of the King Edward Medical College, Lahore, were given a course of lectures in vaccination. In the C. P., the usual course of training for vaccinators, lasting seven weeks was given to 75 new vaccinators, while four persons were trained as assistant superintendents of vaccination, including 2 sanitary inspectors. At the Vaccine Institute, Belgaum, a training class for vaccinators was held at which 27 candidates, who appeared for the final examination, passed. In addition, 3 Medical Officers of Health, 2 Medical Officers, 2 inspectors of sanitation and vaccination and one chief sanitary inspector were given special training in the preparation and preservation of lymph and in the theory and practice of vaccination. No vaccination training classes were held in Burma this year.

Vaccination in Provinces.

76. *N.-W. F. P.*—The staff consisted of 6 superintendents of vaccination and 48 vaccinators (including 4 temporary vaccinators).

Owing to low prevalence of smallpox during the year, there was a decrease in the number of vaccinations performed. Successful primary vaccinations numbered 135,641, including 74,861 on infants under 1 year of age and 48,778 on children over one year and under 6 years. Successful revaccinations totalled 114,192, the rate being 59 per 1,000 of the population. The attitude of people towards vaccination was favourable except in the districts of Bannu and Dera Ismail Khan. Of the total vaccinations performed 36,113 were done in Political Agencies, and 6,830 (1,804 primary and 5,026 revaccinations) in cantonments. The average number of vaccinations performed by each vaccinator was 5,349.

77. *Punjab.*—No important change took place in the administrative and other arrangements for vaccination. The number of vaccinators employed

by local bodies increased by 5 to 538 while provincial vaccinators remained unchanged.

A further decrease in the total number of vaccinations performed, compared with previous years, was due to the great fall in the prevalence of smallpox in the province and the smaller number of births recorded during the period under review. The figures given below are of interest :—

Year.	Number of deaths from smallpox.	Number of total vaccinations performed.	No. of vaccinations per one death from smallpox.
1932-33	9,726	3,607,285	371
1933-34	6,990	3,206,356	459
1934-35	1,495	3,113,487	2,083

Of the total operations performed those done by the district board and municipal vaccination staffs numbered 3,037,254—893,650 primary and 2,143,604 revaccinations.

Municipal vaccinators did 304,276 vaccinations (97,926 primary and 206,350 revaccinations) ; special provincial staff 52,154 (17,081 primary and 35,073 revaccinations) ; dispensary staff 3,816 (638 primary and 3,180 revaccinations) ; cantonment staff 18,935 (5,673 primary and 13,262 revaccinations) and the railway staff 1,328 (542 primary and 786 revaccinations).

Women vaccinators were employed by seven municipalities. Lady health visitors who are trained in the technique of vaccination also performed vaccination operations during the course of their routine duties in 7 districts. The employment of a female agency for purposes of vaccinating *purdah* women is still reported to be in an experimental stage. The D. P. H. in this connection remarks :—

" The amount of work done during the year under report was not commensurate with the number of vaccinators employed and the amount of expenditure incurred. However promising the prospects of the employment of women vaccinators may look, the results so far obtained are rather disappointing. The women vaccinator has still got to prove her utility in the province. Should greater stress be laid on the employment of such vaccinators, there is the danger of a demand to employ women vaccinators only for women irrespective of local requirements in this connection. Enquiries so far made are far from convincing and the need of a woman vaccinator does not seem to be very pressing."

The average number of vaccinations performed by each vaccinator was 5,609.

78. *Delhi Province.*—The four municipalities employed 8 whole-time vaccinators ; in rural areas there were three.

In spite of the fact that only 22 deaths were recorded as due to smallpox during 1934 as against 948 in 1933, the number of vaccinations showed only a slight decrease from 35,937 in 1933-34 to 33,935 during 1934-35. The average number of vaccinations performed by each vaccinator was 2,018 in urban and 3,348 in rural areas.

Revaccination amongst women who observe strict *purdah* has been a difficult problem as there are no recognised female vaccinators as yet, but with the increase of women doctors and health visitors this difficulty is slowly being overcome.

School medical inspection again brought to notice large numbers of unvaccinated young children and there is a pressing need for making vaccination and revaccination a condition precedent to the admission of children to the primary schools.

79. *United Provinces.*—The staff comprised 49 assistant superintendents of vaccination and 947 vaccinators.

The total number of operations increased by 93,486 over the figure for the previous year. The percentage of successful operations to total births was only 51 % among children under 1 year of age.

Out of 1,857,729 vaccinations, 1,424,065 primary and 197,770 revaccinations were performed in rural areas; 150,542 primary and 82,002 revaccinations in urban areas; 29 primary and 258 revaccinations in dispensaries; 123 primary and 224 revaccinations by private medical practitioners; and 945 primary and 1,771 revaccinations at railway dispensaries.

Each vaccinator vaccinated on an average 1,935 persons.

The public health staff inspected 4,046 schools for vaccination purposes and 56,352 scholars were vaccinated in their presence.

Although there was an increase in the total expenditure on vaccination, the average cost of each successful case fell slightly.

80. *Bihar and Orissa.*—The provincial staff consisted of 11 district inspectors, 36 sub-inspectors of vaccination and 1,365 vaccinators. In municipal areas, vaccinations were performed by paid vaccinators, but licensed vaccinators were generally employed in rural areas. Additional paid vaccinators were employed by local bodies and civil surgeons for short periods to deal with outbreaks of smallpox.

Vaccination has not yet become popular in the province. During the year under report, in which there was relatively little smallpox, the number of vaccination operations fell by 49,516, the decrease being in revaccinations while primary vaccinations showed a slight increase over the figures for the previous year.

Of the total operations only 72% were successful, a slight decrease from the rate for the previous year.

In municipal areas, 118,888 operations were performed, showing a decrease of 8,816 as compared with last year; of these 60,706 were successful. The success rates were 98 % in case of primary cases and 50 % for revaccinations.

Vaccination operations performed in rural areas numbered 1,719,205 and the ratios of success were 99 % for primary and 61 % for revaccinations.

The average number of vaccinations performed by each vaccinator was 1,346.

Unprotected children under 1 year numbered 1,077,354. Of these only 276 p.m. were successfully vaccinated and even in municipal areas only 447 p.m. of the surviving unprotected infant population were successfully vaccinated. These figures are unsatisfactory, showing as they do, that nearly three quarters of the total infant population remained unprotected.

81. *Bengal Presidency.*—The strength of inspecting staff remained unchanged, whilst the number of vaccinators decreased from 1,803 to 1,738 in rural areas and from 175 to 163 in municipalities. With the general amalgamation of vaccination with public health work and the provision of general health staffs, both in rural and urban areas, the above figures cannot be regarded as a correct record of the numbers of vaccinators in Bengal.

An increase of 257,037 vaccinations was recorded compared with the previous year, primary cases contributing 103,316 and revaccinations 153,721.

A slight fall occurred in the number of children under 1 year successfully vaccinated, whilst there was an increase in the number of children successfully vaccinated between the ages of 1 to 6 years, the actual numbers being 289,696 and 1,510,464, respectively.

In rural areas 6,144,000 vaccinations (2,509,470 primary and 3,634,530 revaccinations) were performed, both groups showing an increase over 1933. In municipal areas the total number was 589,707 against 588,175 in the previous year. In tea gardens 15,492 vaccinations were performed, in factories 55,377, in railways 27,600, on steamers 985 and in jails 63,210.

Of the available infant population, 237 p.m. were successfully vaccinated, the rates being 218 p.m. in rural areas and 600 p.m. in municipalities. Infant vaccination results in the districts of Faridpur, Rangpur and Mymensingh were not encouraging, and indeed the percentage throughout the rural areas is dangerously low.

The average number of vaccinations performed by each vaccinator was 3,352.

Rotatory lancets are now supplied to all municipalities and districts by the Bengal Public Health Department. It has been unanimously reported that vaccination with this lancet is much superior to the scarification and linear incision methods.

82. *Central Provinces.*—The vaccination staff comprised 37 assistant superintendents of vaccination and 324 vaccinators.

Of the total number of vaccinations performed which showed an increase of 37,057 operations over the figure for the previous year, 563,641 primary and 148,999 revaccinations—were done by district vaccinators, 2,677 by dispensary staff and 11,381 by other agencies, *i.e.*, railways, mines, tea gardens etc.

The average number of vaccinations performed by each vaccinator was 2,193.

In municipalities out of 50,840 infants requiring vaccination, 43,910 or 86 % were vaccinated.

83. *Bombay Presidency.*—Of the total primary vaccinations which showed an increase of 45,185 over the figures for the previous year, 93 % were successful and 0·14 % unsuccessful. The percentage of success was 99·85%. Sixtynine per cent. of primary vaccinations were performed on infants under 1 year of age and 27 % on children between 1 and 6 years. Of the revaccinations in which the results were known 46 % were reported as successes.

The average number of vaccinations performed by each vaccinator was 2,803.

Vaccination in police lines and outposts was regularly carried out, and at important fair centres similar work was done well in advance of the fairs.

At Karachi, 5,509 pilgrims including 4,211 males and 1,298 females, were revaccinated by a temporary staff during the months of November, 1934, to February, 1935.

84. *Madras Presidency.*—The number of vaccinators was increased from 862 to 879. In addition, 278 health inspectors were employed on vaccination work.

Operations rose from 4,552,755 in 1933-34 to 5,223,920, increases being recorded under primary, secondary and revaccinations. The marked increase in revaccination figures was largely due to the enforcement of compulsory

revaccination throughout the Presidency. Of the total operations, 46% were successful as against 53% in 1933-34.

Each vaccinator performed 5,908 vaccinations on an average.

The number of vaccination operations performed in rural areas was 4,444,061 (1,273,562 primary and 3,210,499 revaccinations) showing an increase of 599,077 over that of the previous year. Successful vaccinations among children under 1 year of age numbered 543,947, the proportion of vaccinations to registered births varying from 19 % to 64 % in districts. The year witnessed one of the most important changes in local Government administration, namely, the abolition of taluk boards. The advantages of the transfer of vaccination to district boards are manifold. This transfer has brought about centralised control and uniformity of procedure, prompt action now being taken in many districts to supply equipment, to sanction prosecutions and to act quickly in epidemics. It has also enabled District Health Officers to concentrate staff in infected localities. Several district boards have delegated their powers of prosecution of vaccination offenders to the District Health Officers.

In municipalities 139,099 primary and 574,624 revaccination operations were performed, showing a slight decrease in primary cases and a great increase in revaccinations. The proportion of vaccinations to registered births varied according to districts from 25 % to 99 %.

The appointment of women vaccinators to facilitate vaccination among the Gosha communities was recommended to local bodies by Government and some appointments have been made.

85. *Coorg.*—Out of 25,113 persons vaccinated 16,299 were males and 8,814 females. Operations totalled 22,400 in rural areas, 2,642 in urban areas and 71 in dispensaries. In the two towns in Coorg, where the Vaccination Act is in force, 279 infants were vaccinated. Each vaccinator performed, on an average, 2,504 operations.

86. *Assam.*—Vaccination among the general population was performed by 444 departmental vaccinators. The subordinate inspecting staff of 9 inspectors, 20 sub-inspectors and 10 temporary sub-inspectors remained unchanged.

Vaccination operations showed a slight decrease of 1,524 over the previous year, the total number performed being 706,460. Of the total vaccinations performed, 656,712 were done by departmental vaccinators, 7,263 by dispensary staff, 36,426 in tea-gardens, 3,900 in jails, police hospitals, etc., and 635 by railway staff.

Each vaccinator performed on an average 1,588 vaccinations.

Of a total of 6,032 unprotected infants registered in towns, where vaccination is compulsory, 50 % were successfully vaccinated, the success rate varying between 4 % and 75 % .

Vaccination in rural areas is not compulsory, but every encouragement is given to the people to become vaccinated. Amongst certain castes there is marked opposition to vaccination. To overcome this hostility, resort has been made to regulations framed under the Epidemic Diseases Act, 1897 (Act III of 1897), but the better plan would be to extend compulsory vaccination to the districts.

87. *Burma.*—The staff comprised 38 district superintendents, 98 part-time supervising officers, 26 inspectors of vaccination and 349 vaccinators. Temporary staff was, as usual, employed to deal with epidemics.

The total number of vaccinations performed during the year exceeded last year's record. There was a considerable increase in revaccinations, while a slight fall occurred in the number of primary vaccinations.

The average number of vaccinations performed by each vaccinator was 3,735.

Of the total of 992,748 operations performed in rural areas, 561,773 were primary and 430,975 revaccinations. Approximately 89 % of primary vaccinations and 26 % of revaccinations were successful.

In urban areas, excluding cantonments, 313,203 operations (56,221 primary and 256,982 revaccinations) were performed. Of primary operations about 97 % of the verified cases were successful. Of the revaccinations, 30 % of the verified cases were successful.

Other vaccinations done were 2,908 in cantonments, 1,632 by railway dispensary staff, 1,699 by Government dispensary staff, 6,778 by private practitioners, 39,965 in jails and 170,688 at the ports of Rangoon and Akyab on immigrants.

88. *Andamans.*—Vaccinations numbered 1,639 (395 primary, 228 secondary and 1,016 revaccinations) out of which 209 were successful. Of these 1,562 cases were done with Java dried lymph and 77 with glycerinated lymph.

Vaccination amongst troops.

89. Particulars of vaccination in the army will be found in Table B of the appendix to this section (pages 325-26).

Compulsory Vaccination.

90. Table VI (*iii*) gives the number of towns in which compulsory vaccination is in force.

TABLE VI (*iii*).

	Municipal towns and Notified areas.	Vaccination Act in force in		Municipal towns and Notified areas.	Vaccination Act in force in
British India . .	**947**	**797**	C. P. . .	118	84
N.-W. F. P. . .	13	10	Bombay .	114	38
Punjab . . .	249	216	Madras . .	82	82
Delhi . . .	3	2	Coorg . .	2	2
U. P. . . .	85	85	Assam . .	25	23
B. & O. . . .	59	59	Burma . .	74	74
Bengal . . .	118	118	Ajmer-Merwara	5	4

In comparatively few parts of India compulsory vaccination is in force in rural districts. In view of the high endemicity of smallpox in India and the periodical devastating epidemics which occur, it is deplorable that compulsory vaccination should not have been extended long ago to all settled districts. Smallpox is one of the most easily preventible diseases, and there is no reason beyond inertia and lack of administrative vigour why it should not be prevented.

In Madras Presidency vaccination is compulsory except in a few areas. The same can be said of Burma where, but for a few backward tracts, vaccination is compulsory. In the Punjab, out of 29 districts the Vaccination Amendment Act of 1929 is in force in 18 districts completely and in 8 partially. Otherwise so far as records go, vaccination remains optional among the rural population.

B.—Indian States.

91. *Punjab States.*—Statistics of those Indian States which maintain their own establishments are given in Table VI (*iv*).

TABLE VI (*iv*).

	Vaccinations.		Success-rate.	
	P.	R.	P.	R.
Patiala	59,692	53,657	98·0	60·9
Bahawalpur	22,337	610	99·7	75·7
Nabha	10,811	1,859	92·7	60·3
Jind	9,765	1,638	99·1	30·2
Kapurthala	8,615	4,887	96·5	43·6
Faridkot	5,457	5,694	98·6	46·2

Gujerat States Agency.—Altogether 32,190 primary and 2,919 revaccinations were performed. The success rate was 94% for primary cases and 47% for revaccinations. The results of 6% of primary and 23% of revaccinations could not be ascertained.

Shan States (Burma).—The staff comprised 2 district superintendents of vaccination, 2 part-time supervising officers and 46 vaccinators. Vaccinations performed in these states numbered 77,157 (56,976 primary and 20,181 revaccinations). Of the verified primary cases and revaccinations 98 % and 55 % respectively were successful. The average cost per successful case was Re. 0-9-8.

Mysore State.—Vaccination operations numbered 317,073. Of these 308,256 (191,567 primary and 116,689 revaccinations) were done by district board and municipal vaccinators and 8,817 (5,429 primary and 3,388 revaccinations) by medical subordinates. Of the vaccinations performed by medical subordinates the success rates were 87 % in the case of primary cases and 57 % in those of revaccinations; amongst those performed by district board and municipal vaccinators, the success rates were 94 % and 38% in primary and revaccination cases respectively.

The cost per successful case was Re. 0-5-5.

The potency of the lymph produced in Mysore continued to be good. Exceptionally in this State, lanoline and glycerine lymphs were prepared and the quantities produced were 2,313 and 1,450 grammes respectively. Lanoline lymph sufficient for 339,104 cases and glycerine lymph for 50,315 cases were issued.

SECTION VII.

PUBLIC HEALTH WORKS.

A.—British India.

General.

92. A perusal of the sections of the various provincial public health reports dealing with civil works brings home the reluctance of local authorities to spend money on sanitary works. The contrast between Great Britain and India in this respect is very marked. In the former country the importance of sound environmental hygiene was early recognised and the public health movement was therefore based on a sound foundation. In India the importance of environmental hygiene has not yet been fully recognised and there is still considerable opposition towards the introduction of sanitary works which mean the expenditure of money and therefore an increase in taxation. The contrast is due mainly to the existence of a public opinion favourable to health improvement in Great Britain and to the lack of such opinion in India. In the absence of a favourable public opinion it is admittedly not easy for a local Government or a local authority to force expenditure on sanitary works however desirable, but the need for such expenditure is pressing and without it substantial improvement of health conditions cannot be obtained. The main requirement here, as in most fields of public health is education, to impress upon Municipal and District Committees and the people in general the fact that good health cannot be maintained without a healthy environment. Further, there is no short cut to environmental hygiene which can obviate the expenditure of large sums of money. The provision of good water supplies, good drainage, the water carriage system of disposal of excreta, satisfactory removal and disposal of refuse, town planning and good housing are all costly measures, but they are fundamental to health and have got to be faced if progress is to be made. Good environmental hygiene has been a feature of most great civilisations since the world began.

One or two features brought out by the provincial reports require special mention. Whereas a good water supply, sufficient in quantity and wholesome in quality, is the first essential, it is noted that not infrequently in towns funds are spent upon less important measures before a good water supply has been introduced. Again it is not infrequent to find that large sums are spent on roads or on hospitals or even on lighting before a safe water supply has been provided. Further, there are not a few Municipal Committees who hand over important executive functions, such as conservancy and rubbish disposal to private contractors whose main object is to make profit and it is rare to find satisfactory disposal of waste products carried out under such a contract system. Another feature constantly met with is the tendency to carry out town cleansing by night instead of by day. Such a system is not likely to be successful except in a modern town unusually well lit by electricity. Almost without exception, when conservancy is done in the dark, it is badly done and there is a great need in many towns for a switch over to daylight conservancy and town cleansing.

Taking the provision of protected water supplies as an index of the development of sanitary works, it is interesting to note that in Madras Presidency, out of 82 municipalities, only 41 have protected water supplies; in the U. P. only six of the eight first class municipalities having a population over one lakh, six out of ten II class municipalities having a population between 50,000

and 100,000 and three of the 28 of the III class with populations between 20,000 and 50,000 have piped water supplies. Thus in these three categories, 30 of the 46 principal towns lack the most essential amenity. The position in other Provinces is very similar.

The sanitary disposal and agricultural utilisation of habitation wastes.—Many systems have been tried for the sanitary disposal of refuse and human waste by manual methods but there is one system recently developed for composting agricultural and human wastes which deserves special mention. The detailed technique of the process, as used in Indore, is described in the Appendix to Bulletin No. 1, 1934, of the Institute of Plant Industry, Indore, Central India, and is reproduced in full below :—

"*Installation.*—The essential part is the charging trench, which should be fifteen feet wide, and two feet deep. The floor must slope gently along its length to prevent water-logging, and must discharge into a natural drainage channel. It must be served by a road to be used as a charging platform running alongside. This road may lie between two trenches, serving each, and usually the most economical construction is to dig the trenches, one foot deep and pile enough of the excavated earth to make the road foundation. The road should be at least fifteen feet wide (preferably twenty feet) and suitably metalled to stand carting in wet weather. The side of the trench against the road must be vertical and should be reveted with timber or a wall of stone or brick, the top of which should carry a sill of suitable material (*e.g.*, old steel rails, girders, or heavy logs) against which carts can back. Without this sill a log must be put in position at each tipping. The other side of the trench is to be bounded, preferably by a partition, the top half of which is removable—old sleepers, boards, logs, or thick corrugated iron sheet between upright posts—or by an earth, stone or brick wall, rising two feet above the trench floor. Beyond this partition about twenty feet space must be left for storage ; in practice extensive sales of compost are usually confined to two or three periods of the year. This storage ground may be excavated level with the bottom of the trench if desired. Unless dug on solid stony ground the trench must always be floored with road metal or at least well-rammed brick-bats and rubble ; the storage ground is also better so treated. It is wise to build an earth bank with a drain on those sides of the whole installation from which the flow of surface water is to be feared."

"The total length of charging trench required is determined by the average daily quantity of refuse received. Experience has shown that for each cart-load* of refuse received daily, 1 foot 4 inches length of trench is necessary. The volume of night-soil received has no influence on this figure as it is taken up in the interspaces."

"*Charging the trench.*—The first charge should be made so as to leave a vacant space of four feet at one end of the trench. To start with, cart-loads of refuse, without sorting, are tipped in from the charging platform and spread by drag rakes to make a layer three or four inches thick. About a dozen forkfuls of inoculum from a charge at least two weeks old is then scattered (this of course is not necessary for the first charges of a new installation) and the cartful of night-soil tipped on top, followed immediately by more refuse, tipped over the night-soil. Then the refuse, together with the night-soil below is drawn by drag rakes in small lots until the breadth of the trench opposite is covered. About four layers per day should be made thus until the whole depth is charged in two days. The top layer for the day and at the end of the charge should be refuse only, without being mixed with the night-soil layers beneath. This top layer should not be more than 1 inch to 2 inches thick, being intended as a coating to preserve uniform moisture and heat in the whole mass of the mixture, and to prevent the breeding of fly larvæ on top. The next charge should be given to the adjacent portion of the trench without any interspace and so on continuously."

"*Proportion of night-soil to refuse.*—No proportioning is necessary ; whatever quantities of refuse or night-soil arrive must be treated at once, no excess of either being left over. If the proportion of night-soil is high or of a very liquid nature, the refuse layer should be spread with a surrounding raised margin until the mixing is complete. After the charge or the later turns the heaps must have flat tops and vertical sides, otherwise difficulty will arise in preventing water-logging in a wet season and in keeping uniform moisture during dry weather."

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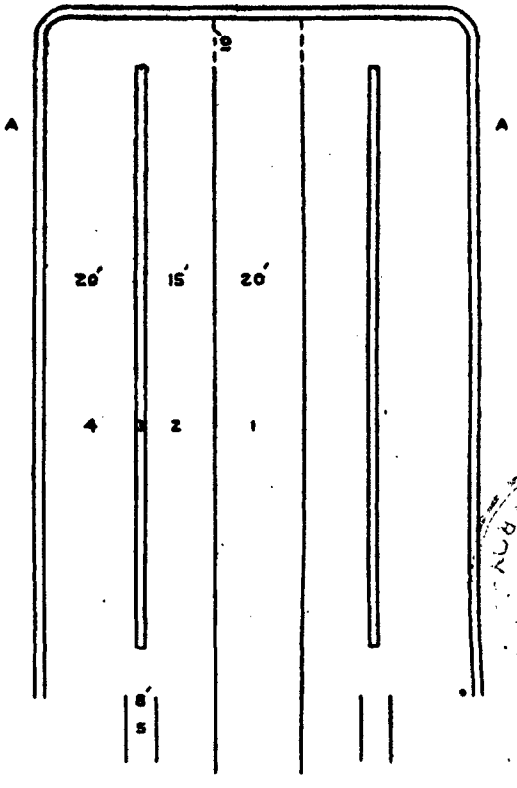
* A cart-load of refuse is here taken as 35 cubic feet and a cart-load of night-soil as 60 gallons.

№ 8

PLAN OF MODEL INSTALLATION

Scale 1"=20'



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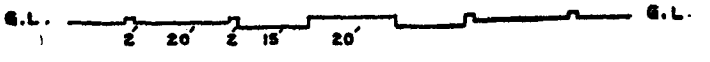

1. Road. 2. Charging trench. 3. Partition.
4. Storage space. 5. Drain.

"*First turn.*—Two days after charging is finished the first turn is given—*i.e.*, four days from the start. Half the charge is forked* back to a position occupying the four feet vacant space left. Then the remainder of the charge is forked on top of this already turned mass."

"While this is being done water should be distributed if necessary from a hose or by hand upon the turned material so as to soak it without permitting seepage or local water-logging. Sullage water may well be applied to the lower layers at this stage but on no account to the surface."

"The few fly larvæ that may be found on the cool sides of the charge are turned into the heap and destroyed by the high temperature therein. If the first turn is delayed beyond four days there will be a greater development of maggots and more chance of their escaping to pupate in crevices in the walls or floor of the trench, especially in wet weather. Such pupation is usually slight and if desired can easily be checked by disinfectants."

"*Second turn.*—The second turn is given eight days later by forking the charge over to the opposite side of the trench, adding water if necessary."

"*Third turn.*—This should be given from eight to fifteen days after the second turn according to the stage of decomposition—when the material has crumbled to a fairly advanced degree. The mass is forked out of the trench (with watering as necessary) on to the adjacent storage ground where it may be heaped up to four feet in height."

"*Watering between turns.*—During very hot or windy weather the upper layers may become too dry; a well-distributed surface watering should then be given."

"*Duration of the process.*—The manure will be ready for use in from three to eight weeks after charging, the period depending on the proportion of night-soil to refuse, the correct control of moisture and air throughout and the season."

"*Precautions during monsoon rains.*—The initial charge should not occupy the full width of the trench; a two-feet space should be left next to the partition to allow storm-water to flow. If there is a risk of water flowing into the trenches from the road the charge should be built up a foot higher, above road level. In a trench of considerable length there may be a danger of exposed corners of the heap being washed away by drainage water on the trench floor. This can be prevented by protecting such surfaces with strips of sheet iron about three feet long and suitable height. During prolonged rains it is advisable to give the third turn earlier, to prevent water-logging and slowing down decomposition."

"*Implements necessary.*—One drag rake with four seven-inch blunt steel tines and a long handle, and one fork will be needed to deal with a daily intake of five cart-loads of refuse.† English shovels are useful for handling the finer material."

"The sprinkling of water to ensure good distribution may be done, on a small scale by throwing it with a suitable vessel such as *tagari*. For larger installations a hand pump with a hose and sprayer or even a permanent supply of piped water would be more efficient."

On account of the many possibilities both from the public health point of view and that of the agricultural needs of India the method has been brought to the notice of all local Governments and constituent States of the Imperial Council of Agricultural Research. From the information available it appears that only a few provinces and states have so far tried the process experiment tally and unless this is done extensively in all the provinces and the results analysed it will be idle to emphasise its general adaptation. Considering the very small expenditure involved in the process it is hoped that the provincial authorities will give the matter the encouragement it deserves.

The Indore process, or a modification of it suited to village conditions, has been for some time past in the fore-front of agricultural propaganda in the United Provinces. There, every Government farm adopts this process of making compost and the method is said to have been taken up by a number of bigger farmers and to be in operation at several village centres and in Shahjahanpur Municipality. An investigation based on the Indore process is

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* A four-pronged garden digging fork has been found very suitable.

† These implements can be supplied by the Trading Section of the Institute.

in progress at the Research Farm at Cawnpore and such modifications as may either speed up the process or render it more easily applicable are being examined.

The method has been successfully tried in several places in the Madras Presidency and also in Hyderabad-Deccan. An experiment is being carried out by the Public Health and Agricultural Officers in Mandalay (Burma) on similar lines.

In Travancore, Bhopal and in Bangalore similar "compost" methods are in use with various modifications which in the last mentioned place are reported to have accelerated the process and made it more suitable for town wastes.

During 1933-34, the municipalities in British India, out of a total income of about 18 crores of rupees, devoted approximately 3·87 crores or 22 % towards public health. In spite of the fact that there was a slight increase in the income of municipalities, the expenditure on public health showed a decrease.

Municipal water supplies cost Rs. 1,12,47,015, conservancy Rs. 1,44,10,044 and drainage Rs. 35,78,866, these totals being considerably less than those for the previous two years. Percentage expenditure on public health varied from a high level of 45 % in Bengal Presidency down to 10 % in Delhi.

Table VII (*i*) gives for each province the total figures for income and expenditure on public health in municipalities during the year 1933-34. It also gives the amounts devoted to conservancy, water supplies and drainage in each province during that year.

TABLE VII (*i*).—*Provincial expenditure in Municipalities.*

	Income.	Expenditure	Expenditure on P. H. per cent. of income.	Expenditure on—		
				Conservancy.	Water supply.	Drainage.
	Rs.	Rs.		Rs.	Rs.	Rs.
British India	**17,75,48,573**	**3,86,97,745**	**22**	**1,44,10,044**	**1,12,47,015**	**35,78,866**
N.-W. F. P.*	22,69,437	3,69,651	16	2,23,152	43,217	25,419
Punjab .	1,71,98,436	42,44,639	25	9,41,766	12,94,431	8,07,386
Delhi* .	83,24,814	8,67,608	10	2,99,416	3,61,131	64,682
U. P. .	2,05,54,850	57,21,667	28	25,29,216	19,21,831	6,54,073
B. & O. .	54,84,254	17,21,674	31	10,68,090	3,43,818	1,84,145
Bengal .	1,14,93,316	51,86,429	45	28,98,965	10,90,601	3,50,788
C. P. .	84,33,463	21,51,597	26	11,34,487	5,53,352	2,46,067
Bombay† .	4,56,77,107	65,34,360	14	24,42,940	22,29,916	8,52,624
Madras .	2,38,80,463	54,10,507	23	‡	19,26,779§	..
Assam† .	13,93,078	5,18,600	37	2,84,510	1,60,397	22,553
Burma .	3,28,39,355	59,71,013	18	25,87,502	13,21,542	3,71,129

* Figures for the year 1934.
† Figures for the year 1934-35.
‡ Not available.
§ Includes expenditure on drainage.

North-West Frontier Province.

93. The total expenditure on public health measures in municipal towns and notified areas decreased by about one-fourth as compared with the previous year.

District boards with an income of Rs. 21,07,664, including opening balances, devoted only Rs. 93,330 to public health. Of this Rs. 22,886 was spent on water supply, Rs. 4,292 on conservancy establishment and Rs. 1,975 on drainage and sewage.

Government grants-in-aid to municipalities and notified area committees for public health purposes amounted to Rs. 10,206, including Rs. 6,739 for sanitary purposes in Peshawar, Rs. 1,600 for sanitary improvements in Tank notified area and Rs. 1,000 for *anti*-malarial measures in civil areas of Peshawar Cantonment. Similar grants to district boards for water supplies and other public health purposes amounted to Rs. 28,927 including Rs. 12,402 for a water supply scheme for certain villages in Kohat district, Rs. 10,904 for water supply purposes in certain villages in Dera Ismail Khan district and Rs. 1,694 for water supply scheme of certain villages in Hazara district.

Sanitary inspections of towns were made as usual by the Director and Additional Assistant Director of Public Health, and defects relating to drainage and conservancy systems were brought to the notice of local bodies and practical suggestions made for their removal.

Punjab.

94. With an increase in the total income of municipalities, there was also an increase in the total expenditure for public health measures in such areas. In 114 small towns on the other hand total expenditure on public health measures showed a drop.

The sanitary engineering department had under construction 10 public health projects on behalf of Government and 14 for local bodies. Four preliminary and 20 detailed projects, estimated to cost Rs. 1,82,681 and Rs. 23, 30, 329, respectively, were either prepared or revised by the engineers of the department. The most important of these were Okara water supply scheme (Rs. 1,47,120); Okara drainage scheme (Rs. 2,54,167); Khanewal water supply and drainage skeleton scheme (Rs. 62,997), Multan Cantonment drainage (Rs. 1,40,024), Khanewal drainage (Rs. 1,49,662) and Burewala drainage schemes Nos. I and II (Rs. 66,633 and Rs. 94,639, respectively). Seven projects prepared by local bodies estimated to cost Rs. 2,91,240 were examined for technical sanction by the Public Health, Circle, Punjab. These included Lyallpur waterworks extensions (Rs. 85,368) and Saadi Park drainage, Lahore (Rs. 76,062).

Piped water supplies are now in use in 43 towns. Arrangements for the collection, removal and disposal of excreta and street sweepings are still defective in many towns, although a little improvement has been made in a few, where modern sanitary methods are being introduced gradually.

Rural sanitation:—Work accomplished is summarised below:—

(*i*) 171,794 rubbish heaps were removed outside the village, (*ii*) 98,975 manure pits were dug, (*iii*) 161,012 feet of *pucca* drains were constructed; (*iv*) 325,229 house ventilators were constructed, (*v*) 769 bore-hole latrines were made and (*vi*) 534 sanitary sub-committees were formed.

To improve village water supplies, 1,619 parapet walls were constructed, 13,237 wells were cleansed and 2,059 hand pumps were installed.

Sanitary Board (April 1934 to March 1935).—The Board held three meetings during the year, but owing to financial stringency its activities were handicapped. A sum of Rs. 2,12,000 was placed at its disposal for grants-in-aid to local bodies (Rs. 1,37,000 for urban sanitary works and Rs. 75,000 for rural water supply). The amount for urban sanitary works was fully spent, whilst of the grant for rural water supply only Rs. 40,063 were spent, the remaining sum lapsing in the absence of completed schemes. Grants given included Rs. 1,25,000 for Bhiwani drainage scheme, Rs. 12,000 for Montgomery drainage scheme, Rs. 8,642 for Thal *ilaqa* water supply extension and Rs. 15,264 for Fort Munro water supply. The board continued to advise on public health policy and gave administrative approval to schemes placed before it.

Delhi Province.

95. Total municipal expenditure on public health showed an increase over the figure for the previous year. Sums devoted to conservancy and water supply showed an increase, but expenditure in connection with drainage decreased. District public health expenditure was only Rs. 12,634 or 4·25 per cent. of the total income.

The Joint Water Board was responsible for the supply of filtered water to the urban areas of New Delhi, Delhi City, Notified Area Civil Lines, Notified Area Fort, Delhi and Delhi Cantonment. Shahdara has its own water supply from deep tube wells. No municipal supply exists in other areas and water has to be drawn from shallow wells.

The sewage farm at Kilokri dealt with sewage from New Delhi, Delhi City, Notified Area Civil Lines and Fort. The conditions in the sewage farm being thoroughly unsatisfactory, a proposal to remove it from its present site is under consideration.

In the rural areas water supply is either from shallow wells or taken from rivers and canals.

United Provinces.

96. With an increase in the total income of municipalities expenditure on public health showed a slight increase over the figures for the previous year. The expenditure on conservancy, water supply and drainage increased proportionately.

Expenditure on health works executed under the Superintending Engineer, Public Health Department, amounted to Rs. 28,98,633, showing an increase of 3·88 lakhs. Of this total Rs. 4,38,010 were spent on original water works and special repairs, Rs. 18,02,840 on water works maintenance, Rs. 3,53,813 on drainage works and Rs. 3,03,970 on other works. A sum of Rs. 2,50,302 was spent on constructional works. Projects to the value of Rs. 15,70,144 were finally sanctioned; others involving an expenditure of Rs. 25,67,489 were submitted but not sanctioned. Projects estimated to cost Rs. 14,88,125 were under preparation.

Water supplies.—Inspections of water supplies carried out by the Mechanical Engineer confirmed the fact put forward in previous reports that plants at present in use are inadequate to cope with the enormous wastage which is almost universal.

Board of Public Health.—Of a total of Rs. 1,81,681, at their disposal the Board spent Rs. 27,846 on special assistance to pilgrim centres, Rs. 72,625 on urban sanitation, Rs. 66,724 on rural and minor sanitary works and Rs. 14,486 on other works. The grant for pilgrim centres included Rs. 6,141 for the construction of four infiltration wells in connection with the Brindaban water supply ; Rs. 8,687 for the provision of a chlorinating plant in connection with Hardwar water supply and Rs. 2,777 for sanitary arrangements at *Piran Kaliar* fair. Improvements in urban sanitation included Gorakhpur municipal drainage (Rs. 33,732) and Jhansi Municipality drainage survey (Rs. 5,000). Out of the grant under Works, Rs. 10,700 were spent on Dewas fair water supply scheme.

The total income of district boards was Rs. 1,95,50,043 and expenditure on public health measures Rs. 5,48,206, a ludicrously inadequate proportion.

Bihar and Orissa.

97. Total expenditure on public health in the 58 municipalities amounted to Rs. 17,21,674 showing another decrease of Rs. 0·37 lakhs down to 31·4 %. Expenditure on markets and fairs absorbed Rs. 29,347.

District board spent Rs. 5,05,104 on public health measures or only about 3 % of their total income. Expenditure on conservancy totalled Rs. 2,84,618 ; on water supplies Rs. 1,21,469 and on drainage Rs. 8,578, while Rs. 19,108 were spent on markets and fairs. The Engineering Department prepared a preliminary water supply scheme for Chapra, estimated to cost Rs. 3,03,364. Other important projects prepared by this Department for local authorities were Monghyr water works improvement scheme (Rs. 82,029) and Daltonganj water works supplementary scheme (Rs. 32,855).

Bengal Presidency.

98. In spite of an increase in the total income of municipalities, the expenditure on public health measures (including expenditure on water supply and drainage) showed a decrease of about Rs. 52,000 compared with 1932-33. Expenditure on markets and slaughter houses amounted to Rs. 52,879. The main sanitary schemes of municipalities were Asansol water supply (Rs. 68, 356), Champdani water supply (Rs. 9,341), Howrah drainage improvement (Rs. 8,223), South Suburban water supply (Rs. 9,850), Baranagar surface drainage (Rs. 5,113), Naihati drainage construction (Rs. 6,076), Nabadwip water works (Rs. 5,947), Darjeeling water supply (Rs. 9,100), Dacca water works improvement (Rs. 13,683) and Dacca drainage construction (Rs. 8,616).

Out of a total income of Rs. 1,99,38,670, Rs. 26,14,513 were spent on public health, including Rs. 5,96,753 on water supplies and Rs. 29,649 on drainage.

Union boards numbering 4,740 and having a total income of Rs. 90,12,874 spent Rs. 5,87,857 on water supplies, Rs. 68,186 on drainage and Rs. 67,196 on conservancy.

Sanitary Board, Bengal.—The total capital expenditure on water works was Rs. 2,72,893 and Rs. 2,26,339 on sewerage works. Sketch projects for schemes estimated to cost Rs. 36,50,720 were prepared, detailed projects for Rs. 4,00,400 and detailed estimates and plans for miscellaneous works amounting to Rs. 1,95,625.

The inability of Government to make any grants towards the capital cost of water works and drainage schemes again had its effect upon the number

of such schemes undertaken during the year, but the recognition of the importance of well planned water supply and drainage schemes in relation to the health of towns is indicated by the number and extent of the schemes which the department was asked to draw up during the year.

Central Provinces.

99. Municipal expenditure on public health decreased from Rs. 24,48,913 in 1932-33 to Rs. 21,51,597 in 1933-34, these sums forming 29 % and 26 % respectively of the total municipal revenues for the two years. Markets and slaughter houses absorbed Rs. 1,22,076. The Director of Public Health of the province reports that the general situation with regard to water supply in the province is unsatisfactory and gives rise to great anxiety during epidemics of cholera as the purification arrangements are incomplete and inefficient.

During 1934-35, government sanitary grants to municipalities and other local bodies amounted to Rs. 49,064. This sum included Rs. 32,500 for infant welfare work, Rs. 14,106 to cover half the cost of expenditure incurred towards the pay of sanitary inspectors, Rs. 1,527 to cover the half of the pay of midwives and Rs. 931 for *anti*-malaria measures. Grants aggregating Rs. 21,930 were paid to certain municipalities to meet 50 % of the cost of the campaign against rats.

Rural sanitation.—The water supply in rural areas is usually from wells but there are many villages where there are either no wells or the well water is brackish and the villagers use tank or river water. Improvement and protection of water supplies in rural areas is the most important sanitary work that needs to be done. No grants for the improvement of water supplies in rural areas were made during the year.

The aggregate income of the 79 villages under the Village Sanitation and Public Management Act amounted to Rs. 2,08,953, whilst total expenditure to Rs. 2,08,673, including Rs. 4,372 for water supply, Rs. 37,379 for cleaning of village sites and Rs. 3,909 for drainage. Total receipts of town fund and other villages under the *Mukaddam* rules aggregated Rs. 22,366 and the expenditure of Rs. 21,287 on public health included Rs. 292 for water supply, Rs. 12,711 for cleaning village sites and Rs. 157 on drainage. In the *ryotwari* villages of 9 districts, Rs. 4,651 were spent on the improvement of water supplies.

Bombay Presidency.

100. In Karachi city expenditure on public health measures per head of population was about Rs. 3-0-7, the average figure in other municipalities being Rs. 2-5-4. Complete sanitary surveys of 18 towns were made and 31 towns were visited for special inspections or reports.

The municipal water supplies of 8 larger towns were regularly sterilised and maintained their standard of purity. Improvements to drainage works were carried out in 8 towns during the year.

Out of a total population of 3,124,069 in municipalities and notified areas, a population of 2,053,611 or nearly 63 % were provided with water suppy and a population of 809,746 only or 26 % of total had the benefit of under-ground drainage.

Government distributed grants amounting to Rs. 1 lakh for the improvement of village water supplies. These grants, supplemented by allotments

from local funds and private contributions, were expended on constructing wells, tanks, troughs and cisterns, in repairing old wells and in boring operations. Altogether 491 new draw-wells were constructed and 134 step-wells were converted into draw-wells.

The aggregate income of the 28 district local boards and 219 *taluka* local boards totalled Rs. 1,88,34,962 and expenditure on public health works Rs. 8,12,619 or a little more than 4 %.

Board of Public Health Works.—The Board accorded approval to the preparation of the following projects:—(1) Disposal of mill effluent at Broach; (2) Byadji water supply; (3) Amalner water supply and (4) Nipani water supply.

Madras Presidency.

101. *Water supplies.*—Two new water supply installations were completed during the year at Tiruvannamalai and Rajahmundry thereby increasing the number of municipalities with protected water supply systems from 39 to 41. Water supply works were in progress in 3 municipalities and improvements to existing water supplies were on hand in 11 municipalities. Two new schemes at Peddapuram and Hindupur were ordered to be executed.

No new rural schemes came into operation, but for one town a scheme was in progress and for another it was approved for execution. Plans and estimates were under preparation or investigation for 6 further centres.

Drainage.—No new drainage scheme came into operation and only 3 towns possess a modern system of drainage. Drainage works were in progress in 3 towns; plans and estimates were under preparation for 4 towns whilst investigations of schemes for 4 towns were completed.

Assam.

102. The total expenditure on public health increased from Rs. 5,00,902 in 1933-34 to Rs. 5,18,600. Expenditure on markets and slaughter houses amounted to Rs. 15,626.

The 19 local boards in the province spent Rs. 1,41,278 on public health as against Rs. 1,74,557 in the preceding year.

Burma.

103. Of the total municipal income, over 18 % was spent on public health purposes, the largest expenditure being Rs. 35,72,143 or nearly 61 % of the total in Pegu division. Rs. 8·66 lakhs were devoted to markets and slaughter houses whilst Rs. 26,371 were spent on epidemic charges.

Water supplies.—Amongst urban areas the water works scheme at Akyab was completed and as a result thereof those parts of the town, which in previous years suffered from an acute shortage of water now receive an adequate supply. In Magwe a piped supply was made available for the first time. In Moulmein, where 5 tube wells were sunk in 1933, yield tests were continued during the year. The installation of 19 additional pumps in Pyapon was completed whilst in Mandalay, a scheme for consolidating the existing arrangements in connection with the supply of tube well water was under consideration. In rural areas no advance worth recording was made in any district towards improving the very unsatisfactory standard of water supply.

Conservancy and drainage.—A further advance was made towards abolishing the unsatisfactory contract system of conservancy in towns. The Syriam drainage system was continued, new drains being constructed at a cost of Rs. 13,000, whilst Mandalay had under consideration the raising of a loan for improving drainage. In rural areas the campaign to introduce bored-hole latrines progressed particularly in the districts of Akyab, Henzada, Myaungmya and Pyapon.

Rural sanitary works.—In rural areas out of an aggregate income of Rs. 1,08,82,410, a sum of Rs. 8,01,912 only was expended for public health purposes. This total included Rs. 26,362 on water supply, Rs. 762 on drainage, Rs. 2,03,896 on conservancy and Rs. 1,49,949 on markets and slaughter houses.

Public Health Board.—No new sanitary engineering works were financed. Nyaunglebin and Pyapon water supplies were completed at a cost of Rs. 1,93,212 and Rs. 87,870 respectively. Paungde water supply scheme was postponed *sine die* for want of funds.

B.—Indian States.

104. *Federated Shan States, Burma.*—The total income, including opening balances, was Rs. 43,41,540—Rs. 2,45,102 in towns and Rs. 40,96,438 in rural areas. A total of Rs. 1,32,061 was spent on public health measures—Rs. 68,372 in urban and Rs. 63,689 in rural areas. Expenditure on water supplies amounted to Rs. 8,507 for urban and Rs. 3,211 for rural; that on conservancy to Rs. 35,800 and Rs. 20,007 respectively and on drainage to Rs. 5,763 in towns only. A sum of Rs. 12,842 was spent on markets and slaughter houses in urban areas.

Mysore State.—The Sanitary Engineering Department maintained 11 old water works, completed 13 new ones, and carried out improvements in 8, while 6 were reported as under construction.

Four drainage works were completed and three were under execution. Two drainage works estimates were sanctioned whilst in the case of 5 the estimates were pending sanction.

Sixty bored-hole latrines were constructed during the year.

SECTION VIII.

LABORATORIES AND MEDICAL RESEARCH.

Central Research Institute, Kasauli.*

105. In the absence on leave from 22nd March to 14th November, 1935, of the permanent Director, Lt.-Col. J. Taylor, I.M.S., Lt.-Col. H.E. Shortt, I.M.S., officiated. Other I. M. S. officers of the Medical Research Department who served on the staff were Majors Craighead, Webster and Greval and Captains Ahuja and Mallick.

While on leave, Lt.-Col. Taylor attended the Spring and Autumn Sessions of the Office International d'Hygiene Publique, Paris, as the delegate of the Government of India. He was also deputed to study methods of testing the toxicity of plasmoquine at the laboratories of the I. G. Farbenindustrie, Elberfield, Germany, and later submitted a note on the position with regard to toxicity testing of plasmoquine preparations in collaboration with Director, Malaria Survey of India. He continued to act as Editor of the I. J. M. R. and Indian Medical Research Memoirs.

Seven medical officers and laboratory assistants were given practical instructions in bacteriological technique in the Institute.

The main products manufactured were anti-cholera and anti-typhoid vaccines.

Anti-cholera vaccine was issued to the Punjab, Bombay Presidency and Burma and to the Army ; T. A. B. vaccine was as usual supplied mainly for army purposes ; influenza and mixed catarrhal vaccines were manufactured as required, and the institute continued to meet all requirements in India for anti-venine. Other biological products such as high titre diagnostic sera, haemolytic serum, etc., were also prepared and issued.

Table VIII (*i*) gives the quantities in c. cs. of vaccines and sera issued in 1933 and 1934.

TABLE VIII (*i*).

	1934.	1933.
Vaccines.		
Prophylactic cholera	601,590	462,002
Prophylactic T. A. B.	349,454	350,920
Prophylactic influenza	19,790	20,072
Curative (various)	9,118 doses.	8,731 doses.
Autogenous	517 doses.	800 doses.
Manufactured sera.		
Anti-venine	5,973 tubes.	173,680
Normal horse	13,820	14,300
High titre (diagnostic)	1,080	718

* Annual Report of the Central Research Institute, Kasauli, including the Annual Report of the Malaria Survey of India for 1934. Manager of Publications, Delhi, Price Rs. 3-4-0 or 5*s.* 6*d.*

Abbreviations—

I. R. F. A.	Indian Research Fund Association.
S. A. B.	Scientific Advisory Board of the Indian Research Fund Association.
G. B.	Governing Body of the Indian Research Fund Association.
I. J. M. R.	Indian Journal of Medical Research.
I. M. G.	Indian Medical Gazette.
D. T. M.	Diploma of Tropical Medicine.

The study of the serological reactions of cholera vibrios in relation to their chemical structure and the results of prophylactic experiments in animals have shown certain points of interest which may be of value in selecting strains for vaccine but the exact interpretation of the findings is not yet clear. Previous findings regarding the keeping properties of cholera vaccine up to six months after manufacture were confirmed and further trials were in hand to examine the possibility of fixing a longer expiry period.

Following experimental work, a method of concentrating anti-venomous serum by ammonium sulphate precipitation was adopted for routine use and from April, 1934, only the concentration product was issued. The concentrated serum has been found to retain its full potency for at least one year.

Table VIII (*ii*) shows the results in a series of cases treated in recent years in which definite identification of the snake as a cobra or Russell's viper was made or there was a fair probability of the snake being one or other of these species.

TABLE VIII (*ii*).

	Cases.	Recovered.	Per cent. of total.
(1) Cobra identified . . .	29	25	86
(2) Probably cobra . . .	37	29	78
(3) Russell's Viper . . .	13	12	92
(4) Probably Russell's Viper .	26	24	92

Anti-meningococcus vaccine was also prepared from local strains of meningococci types I and III isolated from cases of c. s. fever at Delhi. Of this 32,853 c. cs. were issued free for experimental purposes. From the reports received, its prophylactic value is doubtful.

The institute also continued to store and issue imported curative and prophylactic sera for the army in India.

A type collection of micro-organisms was maintained from which strains were issued for study, teaching purposes, vaccine manufacture, etc. Media stains and other requirements for bacteriological work were also prepared and issued. The institute library was used by numerous workers, both civil and military.

Research Work.—The succeeding sub-paragraphs give a brief resumè of the more important problems dealt with during the year but for further information the Director's report should be consulted. Nine papers by the Institute staff were published during the year.

(A) *Studies on vibrios.*—Serological relationship and antigenic structure of vibrios isolated from different sources were studied.

(*i*) *Agglutinable carrier vibrios.*—Five strains isolated from healthy persons in Diamond Harbour, an endemic area, appeared on examination to be of the same serological nature and gave the typical biological reactions, including agglutination, shown by a characteristic vibrio isolated from a fatal case of cholera.

(*ii*) *Inagglutinable carrier vibrios.*—A group of five vibrios selected from the same source was studied; these were not found to fall into any definite serological group and a comparison of them with a series of cholera variants did not show any relationship to the strains with which they were compared.

(*iii*) *Serological relationships of vibrios isolated from water in a non-endemic area.*—One strain isolated from a stream liable to pollution, was supplied by military authorities from Kohat, where no case of cholera had occurred for many years. On arrival, it was found inagglutinable and showed certain other differences from *V. cholerae*. After a period of 6 months subculture, it developed the full serological reactions of *V. cholerae* in regard to both its "H" and "O" fractions.

(*iv*) *Comparative value of vaccines made from different vibrio strains.*—Judging from a series of protection (animal) experiments with vaccines prepared from typical cholera strains and agglutinable and inagglutinable vibrios isolated from carriers, the highest degree of protection would appear to be obtained when strains of chemical structure, similar to the typical cholera vibrio used for infection, are used for vaccine.

(*v*) *Cholera diagnostic sera.*—Comparative trials were made of the value of high titre sera for agglutination tests prepared by injection of (*a*) living cultures, (*b*) formalinised cultures, (*c*) cultures killed at 55°C. for half an hour and (*d*) by injection of a dried antigen prepared by boiling suspensions in alcohol for one hour. Sera of these different types were found to be of value for special types of antigenic analysis. The sera raised against the living cultures were found to have a wide range of action while those raised against the boiled antigen were capable of more detailed differentiation of strains.

(*vi*) *Differentiation of chemical fractions of Vibrio by anaphylactic methods.*—Protein and carbohydrate substances obtained from Dr. Linton were tried unsuccessfully for sensitisation of young guineapigs, subsequent tests for the development of anaphylactic shock being made.

(B) *Indian strains of meningococcus and preparation of anti-meningococcus vaccine.*—A series of cultures of meningococci was obtained from the cerebrospinal fluid of cases in Delhi and a type serum was prepared. As a result of the examinations made the meningococci during the epidemic period were found to belong to type I and type III (group I) as has been the experience in Europe and elsewhere. Strains obtained from Ahmedabad were also found to belong to these types.

A vaccine of these locally isolated strains was prepared and issued for experimental use but sufficient figures are not yet available to prove or disprove its value. Its further manufacture has since been abandoned.

(C) *Anti-venine*:—(*i*) *Comparison of properties of the Kasauli anti-venine and that prepared by the South African Institute of Medical Research.*—It was found that the former could neutralise the South African cobra venom but its effect on puff-adder venom which was not available could not be tested; the latter production neutralised the Indian cobra venom but not that of Russell's viper.

(*ii*) *Studies on the haemorrhagin of snake venoms.*—The titre of neutralisation of the haemorrhagin of daboia venom determined by the intradermal test was found closely parallel in daboia anti-venom sera with the titre for neutralisation of its lethal effect in pigeons. The anti-daboia serum and a serum prepared against *Bitis arietans*, which were tested, were found to neutralise effectively the *haemorrhagins* of heterologous viper venoms. The neutralisation of the *haemorrhagin* of the viper venoms tested by heterologous anti-venine did not effect their immediate lethal action by intravenous injection in pigeons and did not affect the lethal dose.

(*iii*) *Detoxication of snake venom by the photodyanamic action of methylene blue.*—Daboia venom was completely detoxicated, the rapidity of action varying according to exposure to light, the amount of daboia venom present in mixture and the concentration of methylene blue in the solutions used.

(*iv*) *Standardisation of Kasauli anti-venine by the Ramon flocculation method.*—Preliminary experiments carried out have shown that (1) all sera will not flocculate with the range of mixtures of serum and venom employed, although some do so with consistency; (2) flocculation occurs at the same level with the serum of an individual horse at times when its titre is widely prevalent; (3) the irregularity of the results obtained and absence of exact relationship to titre as determined by neutralisation tests make the flocculation method unsuitable for practical standardisation.

In addition the above researches, an investigation into the bionomics of phlebotomus was carried out by Drs. I. M. Puri and D. R. Mehta under the Indian Research Fund Association, while an enquiry on helminths by Dr. V. T. Korke and a protozoological survey by Dr. J. C. Ray under the same auspices were completed in March 1934.

All-India Institute of Hygiene and Public Health, Calcutta.*

106. Lt.-Col. A. D. Stewart, I.M.S., was Director and Lt.-Col. A. A. Baptist, I.M.D. (retd.), Assistant Director throughout the year.

The Government of India continued to provide funds to the extent of rupees two lakhs for four of the six sections originally contemplated. The sections opened were: (*i*) Public Health Administration under Lt.-Col. Stewart; (*ii*) Malariology and Rural Hygiene under Dr. K. V. Krishnan; (*iii*) Epidemiology and Vital Statistics under Dr. R. B. Lal; and (*iv*) Nutrition and Biochemistry under Dr. H. Ellis Wilson. Each Department has been provided with an Assistant Professor. Realising the prime necessity for immediate provision of post-graduate instruction in this branch of public health work, the Countess of Dufferin Fund (W. M. S.) and the Indian Red Cross Society have been providing funds since May, 1933, for the maintenance of a nucleus section for Maternity and Child Welfare, in charge of a member of the Women's Medical Service, Dr. Jean M. Orkney, D.P.H., W.M.S. During 1934, the resources of the section were materially improved by grants from the Calcutta Health Week Committee, the Indian Football Association, the Calcutta Corporation, and by donations from Mr. B. N. Birla and Mr. Khaitan, etc. It is hoped the Government of India will soon be able to shoulder the financial responsibilities in respect of this section and open the remaining section of Sanitary Engineering.

The first course for the Diploma in Public Health was held at the Institute in 1932-33, when out of 24 candidates on the rolls 23 appeared and passed Part I and 20 Part II. During the session of 1933-34, courses were opened for the Diploma in Public Health of the Faculty of Tropical Medicine and Hygiene of Bengal and for a Diploma in Maternity and Child Welfare.

The Government of Bengal have sanctioned the affiliation with effect from the session of 1935-36 of this Institute to the University of Calcutta for the purposes of the Diploma in Public Health. The Calcutta University has

* Annual Report of the All-India Institute of Hygiene and Public Health, Calcutt 1934. Government of India Press, Calcutta.

instituted a Doctorate of Science (Public Health) which is a higher degree open to those holding a D. P. H. and will be obtainable after a year's study and research in some special public health subject. The Institute has been recognised for the purposes of this Degree.

Accommodation being available, five important enquiries have also been based temporarily at the institute including (*a*) leprosy research under Dr. E. Muir, (*b*) tuberculosis enquiry under Dr. Ukil; (*c*) cholera enquiry under Dr. Linton; and (*d*) Anopheles *ludlowi* enquiry under the Bengal Public Health Department.

Department of Vital Statistics and Epidemiology.—In addition to teaching, this department was associated with the cholera carrier enquiry under the I. R. F. A. and controlled the field section and the statistical enquiry which aimed at a study of the factors concerned in the endemicity of cholera. An attempt was made by the calculation of intercensal populations in 11 districts, according to Dr. R. A. Fisher's method of analysis to classify cholera mortality by *thanas*. These studies, it is hoped, will reveal some of the mysteries in connection with the endemicity of cholera and provide a sound basis for forecasting epidemics.

The field section was organised with three objects—(*i*) to make a detailed study of the actual happenings which determine the origin, progress and termination of cholera outbreaks in an endemic area, with special reference to the part played by cholera carriers; (*ii*) to make a bacteriological study of vibrios, isolated from cases contacts and healthy persons living under natural village conditions; and (*iii*) to determine the personal and environmental conditions conducive to the carrier state. A detailed epidemiological survey of a group of 16 villages in the Diamond Harbour *thana* was completed. The basic study of the data, recorded and analysed systematically, will, it is hoped, lead to a better understanding of the mechanism of the incidence of cholera in endemic areas and of the rôle played by the vibrio carriers in this connection.

Department of Malariology and Rural Hygiene.—This Department studied the rôle of the reticulo-endothelial system in the aetiology and prevention of blackwater fever. Other lines of work were (*i*) the factors responsible for the proliferation, mobilisation and functional activation of the cells of the reticulo-endothelial system on which immunity to malaria is believed to depend; (*ii*) the rôle of cholesterol and other lipoids in malarial immunity, electric charges of normal red cells, red cells infected with malarial parasites and reticulocytes. The Department also carried out minor anopheline surveys in parts of Calcutta.

Department of Biochemistry and Nutrition.—Work concentrated on as complete an analysis of Indian food stuffs as was possible with the methods available. A technique was elaborated for estimating hexuronic acid by titration with the reduction indicator 2·6 dichlorophenolindophenol. By this method the vitamin C content of some 60 food stuffs including fruits, vegetables, cereals, pulses, etc., was ascertained and certain fruits of the citrus variety, *e.g.*, Indian orange and lime were found to be not so poor as was previously believed. The excretion of vitamin C and reducing substances in the urine under different conditions were also investigated; imported halibut liver oils were studied—while an investigation was made into the metabolism of carotene which indicate that the cells of the reticulo-endothelial system are probably concerned in the transformation of carotene to vitamin A.

This Department also tested the value of a special diet, elaborated by the Bombay Health Week authorities, while voluntary workers studied the analysis of food stuffs; radio-active water and vitamin deficiency; *atta* and rice diets;

factors favouring calculus formation ; and the preparation of vitamin B concentrates. A survey in a number of families and two orphanages, one Hindu and one Muslim, showed that the diets are low in protein, fat, especially animal fat, and calcium.

Investigations were also made into the albumin and globulin content of the blood in the different types of leprosy and on mineral metabolism in experimental scurvy.

Maternity and Child Welfare Department.—In addition to theoretical instruction, this section provided practical experience in maternity and child welfare and school medical work for students studying for the Diploma in Maternity and Child Welfare. For this purpose a demonstration unit aiming at continuity in care of the individual from conception to school leaving age has been organised in Calcutta.

School of Tropical Medicine, Calcutta.*

107. Lt.-Col. R. Knowles acted as Director throughout the year, Lt.-Col. Acton, the permanent Director, being on leave preparatory to retirement. Dr. R. T. M. Hayter continued as Assistant Director.

During the year, two members of the staff, Dr. D. N. Roy, Assistant Professor of Entomology and Dr. B. M. Dass Gupta, Assistant Professor of Protozoology, were awarded Rockefeller Foundation Fellowships. The Minto medal was awarded to Lt.-Col. S. S. Sokhey, I.M.S., an officer of the Medical Research Department and the Chuni Lal Bose medal to Dr. Y. Y. Ying.

The School continued to function as a centre for post-graduate teaching and medical research. Of the 36 students who appeared for the D. T. M. examination in April, 32 passed. Thirty students attended the D. P. H. course ; 28 appeared and 24 passed Part I in May ; 4 appeared in Part I and 23 in Part II in September and 3 and 16, respectively, were successful.

Investigations in progress during the year included hookworm under Dr. Maplestone, respiratory diseases under Dr. Napier, leprosy under Dr. Muir, bowel diseases under Dr. De Monte, diabetes under Dr. J. P. Bose and filariasis under Dr. Sundar Rao. The "I. R. F. A." continued to provide funds for two professors of Pathology and Protozoology and to subsidise no less than 11 enquiries on kala-azar, indigenous drugs, drug addiction, dermatology, malaria, helminthology, cholera, leprosy and blood changes in certain tropical diseases.

The Carmichael Hospital for Tropical Diseases, attached to the School, continued to function as a teaching and research hospital.

Departmental activities. (a) Department of Tropical Medicine.—This concentrated chiefly on teaching for the L. T. M. and D. T. M. courses, and a careful study of hospital cases. Special features were the treatment of *B. coli* infection of the urinary tract with ketogenic diet, of splenomegaly with intramuscular injections of turpentine, and a study of epidemic dropsy in the Manbhum district of Bihar.

* Annual Report of the Calcutta School of Tropical Medicine and the Carmichael Hospital for Tropical Diseases, 1934, Bengal Government Press, Alipore, Bengal, 1935 (Gratis).

(*b*) *Department of Bacteriology, Pathology and Helminthology.*—This Department played an important part in the cholera enquiry financed by the I. R. F. A. and carried out investigations into the clinical, carrier and toxin aspects of cholera as well as basic research on the cholera vibrio and bacteriophage, in which 12 types of choleraphage and 15 of vibriophage were isolated. Evidence obtained did not substantiate D'Herelle's claim that under 'phage action strains of the cholera vibrio always lose their virulence ; on the other hand in some instances the virulence was found to increase.

In regard to the antigenic structure of vibrios, it was found that the serological test, which has so long been held as the one test essential in the diagnosis of the cholera vibrio, is not absolute.

The carrier enquiry worked for about six months of the year ; true cholera vibrios being isolated from 62 % of clinical cases and 0·8 % of contacts and healthy persons.

In the toxin enquiry Hahn and Hirsch's experiments were repeated under strictly controlled pH conditions. Fifty recently isolated strains of agglutinating and non-agglutinating vibrios from fatal cases of cholera and four El Tor strains from the National Collection of type cultures were used. Intraperitoneal injections of the filtrates in large doses (2-5 c.c.m.) failed to produce death or any marked effect on guinea-pigs. Other problems investigated included the amine theory of cholera ; minimal lethal dose ; skin reactions ; toxic effects of bacteriophage ; variations in the virulence of organisms after bacteriophage action ; susceptibility of animals to cholera ; and metabolic activities of cholera vibrio.

The clinical 'phage enquiry worked for 6 months but the evidence obtained did not support the value of 'phage in the treatment of cholera. Work was also carried out to determine (*i*) at what stage in the disease 'phage appears in the stool and the correlation of the presence of 'phage and the condition of the patient ; and (*ii*) at what period in the disease agglutinating vibrios are replaced by non-agglutinating vibrios.

(*c*) *Protozoology Department.*—In addition to routine examinations, this department studied the problems of malaria and filariasis transmission ; treatment of amoebiasis ; experimental transmission of entamoeba histolytica of macaques to man ; experimental treatment of balantidiosis ; the coccidia of Indian cats ; and latent malaria in monkeys.

In the malaria transmission enquiry the air conditioning cabinet which has been described in previous reports continued to work satisfactorily and transmission experiments were carried out on the three species of parasite using *A. stephensi.* Detailed results of the experiments are given in the annual report of the School, but generally speaking it may be said that the temperatures and humidities, at which transmission can occur, have been ascertained.

(*d*) *Entomological Department.*—The Calcutta anopheline survey was continued during the year and the infectivity of *A. stephensi* artificially infected in the laboratory was studied under unfavourable conditions when it was found that the mosquitoes retained salivary infection. Observations on the natural infection of *A. ludlowi* were carried out and experimental infection of *A. rossi* was also studied.

(*e*) *Pharmacological Department.*—Snake venoms continued to be studied. Daboia (Russell's viper) venom was found to possess a marked tendency to produce thrombosis and gangrene at the site of the bite. The systemic blood

vessels, especially peripheral, are found contracted while those of the splanchnic area are widely dilated as in histamine shock and similarly death is due to secondary shock. The pharmacological action of *Echis carinata* continued to be worked out and biochemical studies regarding the enzymes occurring in different venoms were in progress.

Chemotherapeutic studies included anti-malaria and anti-dysenteric remedies. Investigations in connection with the action of quinine in monkeys infected with *plasmodium knowlesi* showed that this drug acted slower than atebrin. The destructive action of atebrin on this plasmodium was found to be exceptionally powerful. The effectiveness of some new anti-malaria drugs was tested on Indian strains of malaria in a series of patients. "*Malarcan*" probably a derivative of quinine or quinidine has been found to show fluorescence under ultra-violet light in high dilutions.

Work on indigenous drugs related chiefly to the chemical analysis of the root and bark of *Alangium lamarckii* used in indigenous medicine as an emetic diaphoretic and antipyretic, and the experimental use of dried juice obtained from the leaves and bark of *Antiaris toxicaria* common in the Deccan Peninsula and the *ghats* from Konkan downwards which is known as the source of a deadly poison. The chemical analysis of the former drug showed the presence of an alkaloid which produces a slow and maintained fall of blood pressure and has a selective action on the para-sympathetic mechanism, being most marked on the gastro-intestinal tract. The dried juice from the latter was found to have a slight stimulant action on the heart and circulation, but in larger doses to act as a strong cardiac poison.

Vernonia anthelmintica the seeds of which are used in the treatment of leucoderma and psoriasis and are considered to have powerful anthelmintic properties was also studied. Its seeds were found to contain 18 % of a fixed oil, about 0·02 % of an essential oil, a bitter principle and resin, tannins, phlobaphenes, etc. This drug however has no action whatever against hookworm and tapeworms; its anthelmintic properties against ascaris and even against oxyuris are weak and in no way comparable to other compounds now in the British Pharmacopoeia.

In the drug addiction enquiry work was in progress on (*i*) habitual administration of opium in India and (*ii*) changes in the physical and chemical properties of blood sera of opium addicts. In regard to the first, an analytical study of infant cases was made and various factors, *e.g.*, age of commencement, duration of administration of the drug, causes leading to the custom, dosage given, methods of administration and symptoms and effects produced connected with the custom have been discussed. Blood serum changes were studied in 25 cases and the pH in all cases was found to be near the lower limit of normal Indian subjects, whilst the buffer action appeared to be considerably lower.

(*f*) *Department of Chemistry and Physics.*—Ten drugs were under chemical investigation whilst a paper was published dealing with eight others. From *Moringa pterygosperma* a base was extracted which has a strong pharmacological action resembling that of adrenalin. *Ptylophora asthmatica*, a reputed remedy for asthma, yielded 0·44 % of alkaloids, none having emetic properties. A glucoside with an action resembling that of pilocarpin was isolated from *Periploca aphylla*. A paper was published on *Abhra bhasma*, an ayurvedic medicine used as a tonic, which was found to have mineral constituents. The glucosides of *Digitalis lanata* were isolated and purified for

clinical trial. Other work of importance included an investigation into the cause of discolouration of old quinine tablets in government factories and studies on the reduction of nitrates by fungi and on the enzymes of the cholera vibrio.

(*g*) *Serological and Immunological Department.*—In addition to medico-legal and routine serological work, an enquiry into the nature of the blood meal of the anopheline mosquito was concluded and enquiries to determine the blood grouping of different castes in the Indian Army were commenced. A further study was made of the different antigens used in the Wassermann reaction.

(*h*) *Department of Public Health Laboratory Practice.*—An investigation on the constants of the oils made from the three mustard seeds, *sarisha, swet sarisha* and *rai* was concluded and constants for each laid down. Standards have also been given for cow and buffalo *ghee.*

The activities of the special research departments financed by the Endowment Fund mentioned earlier in this paragraph have been summarised below :—

Hookworm.—Experiments have shown that the combination of tetrachlorethylene with chenopodium oils is the best treatment for this infection. Treatment without proper measures for the disposal of excreta was found of little avail in reducing ascaris infection in communities living under insanitary conditions. The relationship of hookworm infection to anaemia in tea garden coolies in Assam was studied and an improved technique for the cultivation of hookworm larvae was elaborated.

Anaemias and respiratory diseases.—It was found that *achlorhydria* was not characteristic of Indians. Most of the anaemic tea garden coolies examined were cases of microcytic hypochromic anaemia and hyperchromic anaemia, which is very frequently diagnosed, was found to be rare.

Work on respiratory diseases included the typing of pneumococci. It was found that the pneumococcal types I and II, so commonly encountered in England, were comparatively rare, less than 12 % of the strains isolated falling into these two types. Much work was done on the manufacture of high titre sera against the types of pneumococci prevalent in Assam, and it was found that 22 undiagnosed strains were agglutinated by one or other of two sera that were prepared.

Leprosy.—The leprolin test has been found to be strongly positive in neural cases and negative, or only very weakly positive, in the cutaneous type of the disease. The test has shown that children are highly susceptible to infection and adults much more resistent. In resistent types of leprous lesions and in neural leprosy, bacilli have been demonstrated in small numbers in 70 % of 73 cases.

All attempts to cultivate the leprosy bacillus on artificial media having so far failed, tissue-plasma media have been tried.

Bowel diseases.—Cholera, dysentery and typhoid phages were prepared, but their value has not yet been proved. Up to 1933 choleraphage, type A, lysed the vast majority of some thousands of smooth agglutinating vibrio strains isolated ; in 1934 the condition was completely reversed and the majority of strains isolated were not lysed. Other activities included an investigation of an outbreak of epidemic dropsy in Bengal and Behar and the prevalence of hill diarrhoea and dysentery in Darjeeling.

The action of choleraphage on the nitrate-reducing reaction of the cholera vibrio was studied and it was found that the phage inhibits this action.

Diabetes.—An important finding was that of the value of the arterio-venous sugar difference as a criterion for measuring the severity of the disease in the individual. Studies of the basal metabolic rate of Indians in health and disease were completed and an important study made of blood cholesterol in diabetes. In connection with the belief that diabetic mortality is increasing in the civilised world, reliable statistics of comparative death rates from diabetes in different Indian races have been collected.

Filariasis.—An apparently new species of microfilaria recorded previously from Patnagarh (B. and O.) has now been identified as *Microfilaria malayi* Brug. The development of the larvae in Culex mosquitoes at different atmospheric temperatures and humidities was studied.

The work of the Pasteur Institute has been dealt with on page 203.

For further details of the activities of this institution, the Director's report should be consulted. Sixty-nine scientific papers were published by the School staff and workers, *vide* list on pages 328—40.

Haffkine Institute, Bombay.

108. Lt.-Col. S. S. Sokhey, I.M.S., acted as Director. Dr. K. S. Mhaskar, Dr. M. B. Soparkar and Dr. P. M. Wagle were Assistant Directors. Dr. B. P. B. Naidu worked as special research worker.

The Institute continued to function as (*a*) the centre for the manufacture of plague vaccine for the whole of India, (*b*) the centre for the manufacture of anti-rabic vaccine for Bombay Presidency and treatment centre for Bombay city, (*c*) the provincial diagnostic laboratory for Bombay Presidency, (*d*) the centre for collection of snake venoms and (*e*) a centre of medical research.

The routine preparation of various prophylactic vaccines and diagnostic work for local hospitals staff restricted the undertaking of research work.

Plague Vaccine.—A total of 1,794,132 doses were issued compared with 1,582,182 in 1933. The largest monthly issue, 273,792 doses, was made in January and the lowest 3,404 in June. British India took 1,203,954 and the Indian States 588,682 doses; Bombay Presidency alone was supplied with 299,208 doses.

Examination of rats.—727,815 rats from Bombay city were examined; of these 34 were found to be plague-infected, 29 being identified as *Rattus norvegicus* and 5 as *Rattus rattus*. The peak of infection was reached in February and March and the minimum incidence from August to December.

Anti-rabic Section.—The work of this section has been dealt with on page 203.

Diagnostic Section.—Bacteriological, serological, pathological and biochemical work was done for various hospitals in the Presidency, 5,800 specimens being examined of which 3,100 were Wassermann tests.

Researc Work:—(*a*) *Plague Vaccine.*—Last year's researches were continued and important observations made. The effect of cold storage at 5°C to 8°C on the virulence of *B. pestis* was determined. The measurement of virulence was carried out by determining the minimum number of organisms required to constitute a lethal dose for a mouse, which was found to vary from 3 to 10 organisms. Further improvement was effected in the biological method of standardising plague vaccine. This has made it possible to maintain

the test dose of plague vaccine absolutely constant. Another important change has been introduced in the preparation of the vaccine. Virulent cultures made from blood obtained from human cases and stored at 5° to 8° now play an important part in the preparation of plague vaccine, replacing the former method of passage through Madras non-immune house-rats. This change has increased the potency of the vaccine, the protective mouse dose now being 0.0017 c.c. as against 0.002 c.c. in the previous year. The protective value of the antiplague vaccines of the different continental makes was tried and it has been possible to establish beyond doubt that the Haffkine vaccine is the most potent. Efforts were made to reduce the toxicity of this vaccine without impairing its protective power, and from experiments done this year the observation has been made that vaccines incubated at 37°C are only half as toxic as those grown at 27°C.

(*b*) *Plague phage.*—A phage supplied by Dr. D'Herelle was tried on animals ; in vitro it proved to be a very potent strain, lysing in 1 in 50 million dilution the plague strain used in our experiments.

(c) *Anti-plague serum.*—Encouraged by the favourable results obtained by treatment of human cases with buffalo immune serum, 15 more buffaloes were immunised to obtain a larger quantity of serum for more extensive field test. Every immunised animal was bled at regular intervals after a given number of injections and the potency of the serum tested. The optimal number of injections to give the highest potency to sera was found to be from 30 to 35. Alongside these, complement fixation tests which did not compare favourably with the animal tests were also tried. A suitable opportunity did not occur to test the serum under hospital conditions.

Epidemiology of plague.—Measurement of immunity to plague of rats from different areas in which the disease had occurred in epidemic form was continued by Dr. Chitre during the year. An accurately measured test dose of *B. pestis* was employed for this purpose and rats from any given area were always tested along with a batch of rats from Madras (highly susceptible to plague) and a batch from Bombay (resistant to plague). Rats from towns and cities situated in the Madras Presidency were examined this year. This investigation has so far shown that the percentages of deaths from plague in the inoculated rats have a general correspondence to the aggregate incidence of plague in the area from which the rats are obtained.

Experiments in the use of proprietary calcium cyanide preparation for destruction of the animal vectors of plague has been continued. A comparative study of the various preparations on the market has been made and a valuable technique for prophylaxis evolved.

Snake venom.—Snake venom was collected during the year for despatch to the Central Research Institute, Kasauli, where the anti-venine serum is manufactured, as well as to various scientific workers in Europe and America for experimental purpose.

Bio-chemical Unit.—This Unit, in addition to examinations for clinical diagnosis, has done valuable work for concentration of anti-plague serum, testing of proprietary calcium cyanide preparations, and manufacture of anti-cyanide treatments.

King Institute of Preventive Medicine, Madras.*

109. Lt.-Col. H. H. King, I.M.S., Director of the Institute, proceeded on leave preparatory to retirement on the 12th April, 1934, Dr. C. G. Pandit acting for the rest of the year.

*Report of the King Institute of Preventive Medicine, Guindy, for the year ending 30th September, 1934, Superintendent, Government Press, Madras, Price *annas 8*.

Vaccine lymphs.—Only glycerinated lymph was issued as before; details of its manufacture will be found in Section VI of this report.

Bacterial vaccines.—Issues included 1,318,011 stock doses of cholera, 35,450 doses of T. A. B. and 285 of influenza vaccines. Other vaccines issued were staphylococcus pyogenes; streptococcus pyogenes; mixed staphylococcus and streptococcus (mixed); B. typhosus (curative); pneumococcus; B. influenza (curative) and compound catarrhal vaccines. The total issue of cholera bacteriophage was 228,760 c.cs. and of dysentery phage 5,949 c.cs., while 27,703 doses of anti-tetanic and 22,982 of other sera were also issued.

Bacteriological, serological and chemical examinations.—Altogether 55,507 examinations were carried out. Of the bacteriological examinations 1,677 specimens were examined for cholera and 602 proved positive. The isolation of *B. typhosus* on 11 occasions from the stools of 35 convalescent patients is of epidemiological interest.

Research work.—Some of this work is summarised below but for details the original report of the Director and the papers published in the Indian Journal of Medical Research should be consulted.

(*a*) *Vaccine lymph.*—In order to eliminate the bacterial content without reducing its potency the possibility of manufacturing vaccinia virus on a large scale was investigated. Cultures were initiated with the routine glycerinated calf lymph virus (dermal strain). This strain has had 30 serial passages on allantoic membranes of developing chick embryos. It has been found that this method is not unsuitable for large scale production, if arrangements could be made to ensure a regular and sufficient supply of fertile eggs and if the cultivated virus were found suitable for use in all respects. No material difference was noted in the course of reaction in animals after vaccination with cultured virus and with routine calf lymph. In their immunising power and in cross immunity experiments the cultured virus and routine calf lymph behaved alike. Further work is being continued on the correlation between the extent of lesions on membranes and their potency.

The effect of clove oil on the virus content of vaccine lymph was further investigated. Experiments to obtain potent dried lymph by Otten's method were continued. The previous finding that buffalo-calf lymph withstood drying much better than cow-calf lymph was not confirmed and a considerable fall in potency was noted when dried lymph was tested after two months storage at room temperatures.

Nijland's seed cycle was modified by substituting human passage lymph instead of the rabbit lymph to vaccinate buffalo-calves. Experimentally the lymph produced by this method was as good as that obtained by the routine cycle.

Other studies included (*i*) the cause of trachoma; (*ii*) the serological classification of streptococci and staphylococci; (*iii*) Eijkman's and William's tests; (*iv*) faecal streptococci in Madras waters and longevity of faecal organism in stored water.

Pasteur Institute of India, Kasauli.

110. Major G. C. Maitra, I.M.S., Lt.-Col. G. Covell, I.M.S., Dr. J. P. McGuire, I.M.D. and Lt.-Col. H. E. Shortt, I.M.S., acted as Directors in succession.

A total of 21,241 patients sought treatment at Kasauli and 122 at ancillary centres. Of these 16,851 underwent the complete course of treatment. A total of 2,567 persons, presumably at risk, were incompletely treated while 1,734 were advised.

Of 1,714 cases treated at Kasauli the biting animal was proved to be rabid in 108 cases; was certified to be rabid in 14 and was probably rabid in 1,400 (14 deaths). The history of the animal was unknown in 169 cases (1 death) and the animal was probably not rabid in 23 cases. The figures for the centres under these categories were: proved rabid, 856 cases (1 death); certified rabid, 892 cases; animal probably rabid, 10,531 cases (60 deaths); history of animal unknown, 2,745 cases (6 deaths); animal probably not rabid, 113 cases.

Table VIII (*iii*) gives the death rates amongst Asiatics treated at Kasauli and its centres according to position of wounds.

TABLE VIII (*iii*).

Position of wounds.	Kasauli.			Centres.		
	Treated.	Deaths.	Rate %	Treated.	Deaths.	Rate %
Leg	806	3	0·4	7,883	29	0·4
Trunk	53	..	..	409	1	0·2
Arm	370	4	1·1	3,781	12	0·3
Multiple . . .	155	1	0·6	915	5	0·5
Face	160	5	3·1	497	14	2·8
Multiple face . . .	101	2	2·0	250	5	2·0

Table VIII (*iv*) gives figures arranged according to lateness of arrival expressed in days for Asiatics treated at the institute and its centres:—

TABLE VIII (*iv*).

	Kasauli.			Centres.		
	Treated.	Deaths.	Rate %	Treated.	Deaths.	Rate %
1—7 days . . .	1,362	10	0·70	11,141	44	0·4
8—14 days . . .	186	2	1·07	1,523	8	0·5
15—21 days . . .	37	3	8·11	461	5	1·1
22—28 days . . .	15	..	..	135	2	1·5
Over 28 days . . .	45	..	..	475	7	1·5

The total included 1,416 cases with 11 deaths at the Institute and 12,565 cases with 40 deaths at the centres in which the biting animal was a dog; a jackal in 180 cases with 4 deaths and 1,733 cases with 23 deaths, respectively; a wolf in 20 cases with 3 deaths at the centres and in the case of 6 cases with 1 death the biting animal was unknown. Other bites were non-fatal. The interval between the bite and death varied between 3 days and 290 days whilst symptoms of hydrophobia appeared from 2 days to 271 days after the commencement of the treatment.

Details of the work of the various Pasteur Institutes mentioned will be found in the following publications:—

(1) Pasteur Institute of India, Kasauli—34th Annual Report of the Central Committee of the Association and the Report of the Director of the Institute for 1934.

(2) Pasteur Institute of Southern India, Coonoor—The Annual Report of the Director for 1934 together with the 28th Annual Report of the Central Committee of the Association for 1934-35. Methodist Publishing House, Madras.

(3) King Edward VII Memorial Pasteur Institute and Medical Research Institute, Shillong—The 18th Annual Report for 1934. Assam Government Press, Shillong (Rs. 1-4-0 per copy).

(4) Report on the working of the Burma Pasteur Institute and Bacteriological Laboratory for 1934 and for 1934-35 respectively—Superintendent Government Printing and Stationery, Burma.

(5) Pasteur Institute, Calcutta—11th Annual Report of the Pasteur Institute, Calcutta, for 1934. Bengal Secretariat Book Depot, Calcutta.

Carbolised 5% Paris sheep vaccine was used both at the institute and at centres. The brain of a sheep which is completely paralysed as the result of infection with Paris fixed virus is made into an 8 % emulsion with a 1% carbolic acid in normal saline. This is incubated for 24 hours at 37°C and then diluted with normal saline to make a 5% emulsion. The vaccine is kept at room temperature for at least 30 days before use.

A number of severe (class IV) cases at Kasauli and at the Lahore centre were given anti-rabic serum in addition to the ordinary course of vaccine treatment.

Complaints attributed to treatment were received from 200 patients, but as usual, most of these bore no causal relationship to the treatment. Two doubtful and one definite case of paralysis were recorded.

Courses of vaccine were issued for 671 animals ; each course consisting of 7 daily injections of a 6% carbolised Paris sheep vaccine, the dosage being graded according to the size of the animal.

The brains of 196 animals were examined and 120 were found positive.

Research Work.—This included experiments on (*i*) the use of live fixed virus in conjunction with anti-rabic serum as adjuncts to dead vaccine treatment ; (*ii*) the antigenic properties of carbolised 5% vaccine ; (*iii*) a rabies virus fixed in the dog for the treatment of animals ; (*iv*) the viricidal properties of phenol ; and (*v*) human experiments to test the value of immune serum in conjunction with the routine vaccine treatment.

Pasteur Institute of Southern India, Coonoor.

111. Major K. R. K. Iyengar, I.M.S., was Director throughout the year. At the Institute 414 patients underwent complete treatment ; 41 were incompletely treated ; 36 were given advice ; and 41 absconded during treatment. For the second year in succession, no deaths were reported among treated cases. In 33 cases the biting animal was proved to be rabid ; in 2 it was certified so ; in 188 it was probably rabid according to history ; in 188 the history of the animal was unknown ; and in 3 the animal was probably not rabid.

Semple's carbolised 5% sheep vaccine was used throughout without any post-treatment complications. The dosage and duration of treatment remained unchanged (*c.f.* this report for 1933, page 204). A total of 993,267 c.cs. of anti-rabic vaccine was manufactured.

Issues to veterinary surgeons totalled 20,300 c.cs., although only 259 animals including 216 dogs were treated.

Of 372 specimens examined, 255 proved positive.

Outcentres.—Treatment was the same as at the Institute. Altogether 10,634 patients (Europeans 293 and Asiatics 10,341) received the complete course and among these 13 deaths occurred, all Asiatics. Those incompletely treated numbered 2,343 (Europeans 26 and Asiatics 2,317) and included 1,899 who were presumed to be at risk ; among these cases also deaths from hydrophobia numbered 13, all Asiatics. Three deaths occurred in cases of jackal bites, one was a fox-bite and 22 were cases of dog-bite. The total death rate was 0·24% the lowest on record ; that among the completely treated 0·12% and that among the incompletely treated 0·68%. The fatal cases in the latter group included 10 who developed hydrophobia

during treatment and 3 amongst those who absconded during treatment. The low mortality during the present and the preceding two years corresponds with the exclusive use of Paris fixed virus and a higher strength and dosage of vaccine. The shortest incubation period was 14 days in a case of dog-bite and the longest, 397 days in a fox-bite patient.

Of the total fatal cases, 13 sought treatment 1—7 days after the bite; 2 after 8—14 days; 3 after 15—21 days; 6 after 22—35 days; 1 case after 43—49 days; and 1 case over 50 days.

Research Work.—Eleven scientific papers embodying the results of investigations carried out at the Institute were published in the "I. J. M. R." and "Current Science". A list is given in the Appendix to this section (page 328).

King Edward VII Memorial Pasteur Institute, Shillong.

112. Lt.-Col. J. Morison, I.M.S., who proceeded on leave preparatory to retirement, was succeeded as Director by Lt.-Col. L. A. P. Anderson, I.M.S., from the 20th July, 1934.

Anti-rabic treatment.—Since the adoption of a 5% emulsion of carbolised killed sheep fixed virus, the fall in deaths and case mortality has been significant. The classification of the cases and the dosage remained unchanged, *viz.*, class I cases, 2 c.c. daily for 14 days; classes II and III, 4 c.c. daily for 14 days; class IV, 6 c.c. daily for 14 days. No post-treatment accidents were reported. A total of 1,751 patients (Europeans 105 and Asiatics 1,646) underwent the complete course: 259 were treated at the institute and 1,492 at the 57 outcentres. Deaths numbered 7, all amongst Indians; 4 among dog-bite and 3 among jackal-bite cases. The death rate ,0·4%, was the lowest on record and the failure rate on five deaths occurring within 15 days after the completion of treatment was 0·3 %. Most of the European patients were, as usual, "lick" cases. In the case of 66 Indian patients the biting animal was proved rabid and only 2 deaths occurred in this group; in 91 cases, including one fatal, it was certified rabid; in 1,190 cases of which 3 died it was probably rabid according to history; in 128 cases the history of the animal was unknown and no patient died; and in 17 cases the animal was not rabid according to the particulars supplied and no mortality was reported.

Vaccines.—There were issued 171,117 doses of anti-cholera, 5,838 c.cs. of T. A. B. and 16,040 c.cs. of influenza vaccines and 871,316 doses of bacteriophage.

Research Work.—Field experiments on the prevention and treatment of cholera under village conditions by the extensive distribution of bacteriophage were continued in the two control areas of Nowgong and Habiganj, but no definite conclusions, either for or against the value of bacteriophage were arrived at. Basic research was carried out on (*i*) isolation of new types of cholera bacteriophage, (*ii*) variation in the rate of multiplication in different types of choleraphage; (*iii*) causes of the absence of certain types of bacteriophage from the brews of cholera dysentery phage prepared for therapeutic use.

For details of results, the report of the Institute should be consulted.

The Assam Medical Research Society continued to be financed jointly by the Assam Government, the I. R. F. A., the Indian Tea Association, the Assam Bengal Railway, the Assam Oil Company and miscellaneous contributions. The main activity of this Society was the study of malaria under Dr. Milford Rice, its research officer. The malaria section was reorganised to

ensure better co-ordination of surveys, routine examinations of specimens, etc. No training class was held this year. A study of malaria factors in Assam showed *A. minimus* to be the significant factor in the Brahmaputra Valley. Areas of non-endemicity and of varying degrees of endemicity were determined and in the latter areas the differences in water conditions were found to determine varying intensity.

Burma Pasteur Institute and Bacteriological Laboratory.

113. Lt.-Col. L. A. P. Anderson, I.M.S., and Major G. C. Maitra, I.M.S., acted as Directors in succession.

Anti-rabic treatment.—A total of 2,074 persons received the full course of treatment, 1,701 at the Institute and 373 at outcentres and hospitals. Advice cases numbered 883 at the Institute and 18 at centres, etc.

Total deaths were 12, all amongst Asiatics ; 8 among the completely treated cases of severe bite (6 at the Institute and 2 at district hospitals), 4 among those who developed hydrophobia and died during treatment at the Institute. Of the fatal cases at the Institute 6 had come for treatment 0-7 days after the bite and 4 after 22-45 days ; 6 had had doses of 7 c.c. each for 14 days ; 1 of 10 c.c. for 7 days ; 1 of 7 c.c. for 6 days ; 1 of 7 c.c. for 4 days and 1 of 7 c.c. for 3 days. The death rate was 0·35% at the Institute and 0·6% at outhospitals ; no death occurred among the cases treated at outcentres. In the ten fatal cases at the Institute, males 8 and females 2, the biting animal was a dog.

In the case of 347 cases treated at the Institute the biting animal was proved rabid ; in 49 cases with 2 deaths it was certified so ; and in 1,305 cases with 4 deaths it was probably rabid. This year the Paris fixed virus was substituted for the Kasauli virus which had been in use since the opening of the Institute. In the case of classes I and II cases, the strength of the vaccine was raised from a 1% to a 5% suspension of brain substance for all treatments given at the Institute, its 3 centres and district hospitals. Class I cases were given 2 c.c. daily for 7 days ; class II cases 2 c.c. daily for 14 days ; class III cases 5 c.c. daily for 14 days ; and class IV cases with injuries on extremities and trunk 7 c.c. daily and those with injuries on head 10 c.c. daily for 14 days. Altogether 207,150 c.cs. of the vaccine were manufactured and included 455 courses supplied to district medical officers.

Seventy-nine courses of vaccine were issued for animals including a cat and a horse and two deaths only among dogs were reported among the inoculated.

Bacteriological Section.—A total of 21,297 examinations were carried out. These included 16,920 serological, 2,934 microscopical, 710 cultural, 493 chemical and biochemical, 159 histological and 81 miscellaneous examinations. The use of Dreyer's method of Widal test was continued and every serum tested against five different emulsions. The demand for prophylactic T. A. B. vaccine was lower this year being 22,852 c.cs. ; that for curative sera, especially anti-tetanic serum was higher, the issues being antidysenteric serum 625,000 units, diphtheria antitoxin 600,000 units, tetanus antitoxin 7,008,000 units, anti-streptococcic serum 3,414 c.cs., antidysenteric serum 270 c.cs., antivenene concentrated 1,630 c.cs. and anti-leptospira serum 2,500 c.cs.

Hydnocarpus oil, pure 230 lbs. with creosote 131,489 c.cs., and alepol solution 26,950 c.cs. were also issued for the treatment of leprosy.

Research work.—Work carried out or in operation included (*i*) the examination of samples of sera against different antigens of B. proteus X 19 ; and (*ii*) a systematic examination of wild rats for leptospiral infestation.

Pasteur Institute, Calcutta.

114. This Institute is a part of the School of Tropical Medicine, Calcutta. A total of 1,134 patients, nearly all from Bengal, had the full course of treatment while 343 were advised to attend other centres to complete the treatment. In addition, 857 were given advice, 3 not at risk discontinued treatment and 170 discontinued the treatment voluntarily. Excluding 3 cases which arrived at the Institute with symptoms, deaths from hydrophobia numbered 3 of which two occurring after 15 days of the completion of treatment were classed as "failures". The 3rd case developed hydrophobia during treatment. The death rate was 0·26% and the failure rate 0·18%. No deaths were reported among Europeans.

Of the total, 147 were lick cases only, 304 cases had superficial bites, 517 had deep bites on the trunk and extremities, and 166 had extensive deep bites on face and head. All three deaths were among cases who arrived at the institute for treatment 4, 5 and 10 days late. The interval between the bites and death varied between 18 and 61 days and the duration of illness from 24 to 84 hours. Patients numbering 4,808 attended the other 135 sub-centres in the Presidency.

Semple's carbolised 1% vaccine made from sheep's brain with the Paris strain of fixed virus continued to be used. The treatment was 5 c.c. daily for 7 days for licks (class I) and for 14 days for bites (classes II—IV). No case of post-treatment paralysis was reported.

Of the 41 specimens, dogs 39 and jackal two, 22 were positive.

Pasteur Institute, Bombay.

115. At the Institute which is incorporated with the Haffkine Institute, Bombay, 2,581 patients applied for treatment. Of these 1,830 cases received the complete treatment, 37 discontinued treatment before completion and 714 were advice cases only.

Health returns from 98·2% of the cases treated were received, one death from hydrophobia occurred within, and 3 deaths more than 15 days after completion of treatment, giving a total mortality of 0·21%.

In the case of 34 patients the biting animal was proved to be rabid ; in 45 it was certified to be rabid ; in 812 it was probably so according to history and in 939 the history was unknown.

The biting animal was a dog in 1,765 cases (4 deaths) ; jackal in 21 ; cat in 25 ; monkey in 15 ; fox in 3 ; human being in 5 ; donkey in 2 ; horse in 2 and calf in one.

Of the 181 animal brains examined 136 were found positive.

Out-centres.—At 58 out-centres 5,806 persons received a full course of treatment and 45 were advice cases. Three patients died of hydrophobia during treatment, eight within 15 days and fifteen over 15 days after completion of treatment, giving a mortality rate of 0·39%. Health returns of only 76·3% of cases treated were received. The centres are being urged to get more complete health returns.

Ten deaths occurred amongst those bitten on the face and 13 deaths among those with bites on the trunk and extremities. In 160 cases the biting animal was proved rabid; in 343 it was certified so; in 3,493 cases it was probably so according to history and in 180 the history of the animal was unknown.

No patient developed paralysis after treatment either at the Institute or at the centre. Anti-rabic treatments issued to veterinary surgeons for the treatment of dogs and other animals numbered 287.

Pasteur Institute, Patna.

116. Cases totalling 4,132 received the full course of treatment, 947 presumably at risk absconded before completing treatment, 418 were advised while 11 cases arrived with symptoms of hydrophobia; 4 developed hydrophobia during treatment and 7 others died of other causes during treatment.

All the 16 deaths from hydrophobia giving a rate of 0·4% occurred among Indians; 2 fatal cases were of class II, 8 of class III and 6 of class IV. In 19 cases the animal was proved rabid, in 10 it was certified so, in 2,325 it was probably rabid, in 1,661 cases the history of the animal was unknown and in 96 cases the animal probably was not rabid. Five deaths were recorded among patients with bites on the face including 2 multiple bites and 11 among those bitten on the extremities. In the case of 14 deaths the patients had sought treatment 0-7 days after the bite; and in the case of 2 deaths, 8—14 days after the bite.

The number of days from the commencement of treatment to the onset of symptoms of hydrophobia was 217 days in one fatal case, varied from 13—31 days in 11 fatal cases, from 33—51 days in 3 cases, and in one case the period was not ascertained.

The interval between the bite and death in these 16 cases varied between 20 and 226 days. Verified jackal bites were fatal in 11 cases (69%) and dog bites in 5 cases (31%).

At the Cuttack centre to which 26,000 c.cs. of anti-rabic vaccine were issued, 337 patients, mostly of classes II and IV were completely treated. In 307 cases the biting animal was probably rabid, 50 left off treatment before completion, 3 were advised only and one case who arrived with symptoms of hydrophobia was not treated.

Of the treated cases, a dog was the biting animal in 156 cases, a jackal in 160 cases, and other animals in 21 cases.

Reports were received from 77% of Asiatic cases treated at the Institute and from 49% of those at Cuttack. Reports received from European cases were 81% at the Institute and 50% at the centre.

All cases at the Institute and centre were treated with 2% carbolised vaccine, except 195 cases who were given 5% carbolised vaccine. Treatment lasted for 14 days except in 5 cases who were given 21 days' treatment.

In addition, 15 cases were treated by civil surgeons while vaccine sufficient to inoculate 19 domestic animals was issued on payment.

Medico-Legal Work.

117. Table VIII (*vi*) summarises the medico-legal work done in provinces employing a chemical examiner.

TABLE VIII (*vi*).

	Cases investigated.	Cases detected.	Samples examined.
British India	**11,268**	**7,192**	**35,671**
N. W. F. P.	426	338	1,323
Punjab	2,340	1,851	8,489
U. P. and C. P. . . .	1,586	1,070	4,150
Bengal	2,363	1,301	5,467
Bombay	1,172	767	5,164
Madras	1,382	1,037	7,437
Burma	1,999	828	3,641

N.-W. F. P.—Cases, totalling 440 comprising 1,375 exhibits, were investigated, the increase being chiefly in poisoning cases. Stain specimens numbered 279. Positive detection was made in 65% of human poisoning cases, and 50% of cattle poisoning, in 86% of murders, etc., and 90% of sexual crimes. Of 52 articles analysed for government departments 36 were cocaine and its adulterants, 2 opium and 2 *lahan.*

Punjab.—A total of 3,614 cases comprising 11,098 articles were examined. Out of 979 human and 62 animal poisoning cases investigated, 582 and 32 respectively were fatal. The percentage of detection under the different heads was 73% in human poisoning cases, 32% in cattle poisoning cases, 89% in blood cases (murder or hurt by violence) and 82% in sexual offences. As usual the poisons most commonly used in human poisoning cases were opium (48%), arsenic (21%), *dhatura* (9%), alcohol (6%) and mercury and its compounds (3%). Arsenic was also found in all the fatal cattle poisoning cases. Miscellaneous examinations included 34 samples of water, 6 of *ghee*, 24 of quinine and 134 of spirituous preparations including chloroform.

U. P. and C. P.—Cases of human poisoning investigated were 371, the total number of medico-legal cases received being 1,586 involving 4,150 examinations. Analyses were 1,870 and stain cases 1,159. Arsenic, opium and *dhatura* were the commonest poisons.

Bengal.—Of the 2,363 medico-legal cases investigated, positive results were obtained in 1,301 or 55%. Medico-legal articles examined numbered 6,169, including 702 samples of preservatives. Poison was detected in 241 cases, opium being detected in 176 articles. Arsenic, alcohol, aconite, oleander, hydrocyanic acid compounds and atropine cases occurred in this order of frequency forming 11, 11, 9, 7, 4 and 3% respectively of the total detected poisons.

Bombay.—In all 5,164 medico-legal examinations were carried out and 1,172 cases investigated, including 628 of suspected human poisoning, 449 stain cases, 45 suspected animal poisoning and 50 miscellaneous. Other examinations included 2,926 samples from the excise department, 284 for government stores and 361 miscellaneous. Among the 628 human poisoning cases, poison was detected in 274, with 105 deaths, opium being present in 142, *dhatura* in 36, arsenic in 18 and other poisons in 78. In animal cases, poison was detected in 22, yellow oleander (*Cerbera Thevetia*) in 16 and arsenic in 6. Reports were made on 205 samples of *ghee*, milk, flour, sugar and lime juice, 26 medicines and chemicals and 2 others.

Madras.—Cases totalling 1,553 comprising 7,608 articles were received for analysis, including 327 for human poisoning, 20 for animal poisoning, 928 for stains and 107 miscellaneous. Poison was detected in 174 human poisoning

cases or 53% of the total. Oleander, opium or its alkaloids and *dhatura* were the commonest poisons detected. Of the animal poisoning cases, 9 or 45% were positive, the common animal poisons being oleander (5 cases) and arsenic (3 cases).

Burma.—In the laboratory 9,079 examinations were made and the number of medico-legal cases was 1,999. Of the 511 cases of suspected human poisons investigated, poison was detected in 213, the most common poisons being arsenic, opium, *dhatura* and oxalic acid.

THE INDIAN RESEARCH FUND ASSOCIATION*.

General.

118. The following is a brief summary of the investigations undertaken by workers of the Association during the financial year, 1934-35. For details, reference should be made to the reports published in the Indian Journal of Medical Research, in its Memoirs and in the Records of the Malaria Survey of India, in the Indian Medical Gazette and other papers. A detailed list of publications is given in Appendix to this section (pages 328—40). A short resumé of the various investigations will also be found in the published report of the Scientific Advisory Board of the Association.

Malaria.

119. A. *Malaria Survey of India.*—(*a*) *General.*—Lt.-Col. J. A. Sinton, V.C., I.M.S., was Director throughout the year. Lt.-Col. G. Covell, I.M.S., Major R. C. Wats, I.M.S., and Capt. H. W. Mulligan, I.M.S., acted as Assistant Directors in succession. Other officers included Dr. I. M. Puri, Entomologist, *vice* Mr. P. J. Barraud who retired in May, 1934, Mr. Raja Ram, Malaria Engineer and Mr. Kehar, Chemist.

(*b*) *Classes and instructional work.*—The annual malaria class held at Karnal from 18th March to 21st April was attended by 19 students of whom 12 qualified. Other workers provided with facilities for study at Kasauli and Karnal included 5 from India, 2 from China and one each from Siam, U. S. A., England and Tanganyika territory.

The Director continued to edit the Records of the Malaria Survey of India. Much of his time was also occupied with the compilation of new health bulletins dealing with malaria and mosquitoes and the revision of the older ones. Volume V of the Fauna of British India series—Diptera, Family culicines, was published and 19 papers by members of staff were published in various journals.

(*c*) *Routine entomological work.*—This included identification of 245 collections of insects mainly mosquitoes and sandflies comprising 6,358 specimens, the collection and preparation of anophelines for class work, and the exchange and augmentation of existing collections.

(*d*) *Surveys.*—Monthly surveys of the seasonal and annual variations in the factors influencing malarial incidence in the Karnal district, a study of mosquito incidence in New Delhi and a mosquito survey of Karachi aerodrome were carried out.

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* Report of the S. A. B. of the I. R. F. A. for the year 1934-35. Price Re. 1, obtainable from the Secretary, I. R. F. A., New Delhi/Simla.

(*e*) *Sind Malaria Enquiry.*—In addition to malarial surveys and routine mosquito collections in the water logged area of Khairpur State, a large amount of material was collected for the study of post-epidemic conditions, endemic conditions and the effects of the Sukkur Barrage on the incidence of malaria. A review of spleen and parasite findings with special reference to spring and autumnal malaria incidence in a rice tract in Larkana district was prepared.

(*f*) *Anti-malarial measures.*—These included experimental work on Paris green dusting in villages in Sind and Karnal ; use of larvicidal fish ; destruction of larvae in streams and irrigation channels and relative values of spraying mixtures for killing adult mosquitoes.

(*g*) *Entomological studies.*—These comprised the chemical composition of the water of anopheline breeding places ; seasonal prevalence of different species of anophelines (larvae and adults) at Karnal; investigation of the geographical distribution of different species of Indian anophelines ; carriage of anopheline larvae in the current of streams and irrigation channels ; breeding of *Aedes Aegypti* ; and study of new species of *phlebotomus.*

(*h*) *Malaria parasites.*—Isolation from *S. irus* of two strains of a parasite having a quartan periodicity ; study and description of morphology, schizogenic cycle, pathogenicity and diagnostic characters of this parasite ; identification of this quartan parasite with *P. inui,* and proof of specific identity of *P. cynomolgi* ; unsuccessful attempts to infect other laboratory animals with the simian parasites, *P. knowlesi, P. cynomolgi* and *P. inui ;* maintenance in monkeys of pure infections of these three parasites ; duration of infectivity of malarial parasites in drawn blood ; and study of monkey malaria parasites from other countries.

(*i*) *Insect of transmission.*—Infection of culicine mosquitoes with Proteosoma ; infection of anopheline mosquitoes with *P. cynomolgi ;* another successful transmission of *P. cynomolgi* by bites of *A. annularis ;* unsuccessful attempts to transmit *P. knowlesi* and *P. inui* by mosquito bites ; preparation of serial sections of infected mosquitoes ; and determination of the seasonal infectivity rate of *A. culicifacies* in Karnal district in nature.

(*j*) *Malarial immunity.*—Continued experiments on the effects of superinfections with homologous and heterologous strains of *P. knowlesi ;* the duration of acquired immunity after cure ; the occurrence and degree of natural tolerance in monkeys ; and experiments on cross immunity between different species of *Plasmodium.*

(*k*) *Therapeutics.*—The relative clinical efficacy of totaquina as compared with quinine ; new qualitative and quantitative tests for atebrin ; investigations into effects of various climatic conditions upon the toxicity of plasmoquin ; the rate and duration of the excretion of atebrin in the urine ; and attempts to prevent the haemoglobinuria which sometimes occurs when *S. rhesus* is infected with *P. knowlesi.*

(*l*) *Bio-chemical.*—The chemical nature of malarial pigment ; cholesterol and phosphorus metabolism in malaria ; and changes in the equilibrium of the serum proteins of the blood at different stages of malarial infection.

(*m*) *Engineering.*—Study of water-logging and drainage problems in relation to malaria in Sind and the Punjab ; study of obstruction of drainage caused by roads ; preparations of plans for a mosquito-proof house ; and study of engineering in relation to various aspects of the incidence and prevention of malaria.

(*n*) *Miscellaneous.*—Detection of a third case of natural canine leishmaniasis in India; successful cultivation of Leishmania from the lesions; unsuccessful attempts to transmit the disease to man and monkeys; no apparent beneficial result in canine leishmaniasis obtained by use of Leishmania vaccine prepared from *L. tropica* and experiments upon the transmission of *L. tropica* by *P. Sergenti* in India.

B. *Totaquina Enquiry by Dr. E. P. Hicks.*—Experimental work carried out in the Borstal Institution and the central jail, Lahore, to determine the comparative values of totaquina, types I and II, and quinine sulphate showed no decided difference in efficacy among the three drugs.

C. *Malaria Transmission Enquiry.*—This enquiry was carried out by Lt.-Col. Knowles, I.M.S., at the Calcutta School of Tropical Medicine. The effect of 11 different combinations of temperature and humidity on female laboratory bred *A. stephensi* fed on gametocyte carriers was examined. A paper dealing with mosquito density and mosquito borne diseases in Calcutta was published. A paper dealing with the nuclear division of malarial sporozoites was published.

D. *Malaria Section of the Assam Medical Research Society.*—Data collected during surveys between August, 1932 and July, 1934, has suggested that *A. minimus* is the principal vector of malaria in Assam. The larvicidal action of rice bran used alone and as a diluent for different strengths of Paris green was further investigated. Mass treatment of children with an increased dosage of plasmoquin 1/6 grain with cinchona febrifuge in the reduction of malaria was continued. Other work included a study of the efficacy of 4 grain tablets of cinchona febrifuge, slow intravenous quinine treatment and certain breeding experiments.

Plague.

120. A. *Plague researches at the Haffkine Institute.* (*i*) *Plague Vaccine.*—Experimental work has been carried out for the last five years on methods of testing the virulence of plague cultures and a standard test has now been devised.

Further experiments on the storage of *B. pestis* cultures at 4°C. to 8°C. showed that virulence remained undiminished for long periods. The optimum temperature for the growth of plague bacillus was found to be 25°C.

A study of the relative protective value of different plague vaccines was also made.

Plague phage.—D'Herelle's phage was found to have no action on bacteria in the body, although in *vitro* it proved very potent.

Anti-plague serum.—No opportunity has yet occurred to carry out a comprehensive field test of the serum prepared at the Haffkine Institute.

Epidemiology of plague.—This work included investigations into the comparative immunity of rat populations in the towns and cities in the Madras Presidency.

B. *Plague Recrudescence Enquiry in the Cumbum Valley.*—The work included (*a*) plague recrudescence problems with reference to rats and their fleas as off-season reservoirs; (*b*) rat flea surveys; (*c*) factors relating to the spread of plague by continuity or metastasis; (*d*) climate of rat burrows; (*e*) cyanogas fumigation of rat burrows; (*f*) an efficient method of disinfestation of grain consignments in bulk under field conditions.

Cholera and bacteriophage.

121. (*a*) *Cholera Enquiry* (*Dr. Linton*).—Dr. Linton has classified vibrios into six groups, according to their chemical structure and has shown that the vibrios of cholera, those of water, the El Tor and the Japanese strains and the dissociants form a single interlocking group. Other work included a study of the chemical changes which accompany dissociation; the chemical structure of vibrios in relation to their sources and characteristics; and vibrio metabolism.

(*b*) *Cholera Toxin Enquiry* (*Capt. Pasricha*).—Hahn and Hirsch's experiments on cholera toxin were repeated under controlled pH concentration of the medium. Acton and Chopra's experiments on the Amine theory of cholera toxin were repeated with freshly isolated strains of cholera vibrios. Other work comprised studies of isolation of amines by Koessler and Hanke's method; minimal lethal dose; skin reactions; toxic effects of bacteriophage; haemolytic property of vibrios; variations in the virulence of organisms after bacteriophage action; susceptibility of animals to cholera; variations in agglutination; the antigenic structure of vibrios and metabolic activity of the cholera vibrio.

Cholera Carrier Enquiry (*Capt. Pasricha*).—The main lines of work were the preparation of media and the bacteriological and bacteriophagic examinations of stools collected by the field section of this enquiry.

Cholera Carrier Enquiry—field section (*Dr. R. B. Lal*).—An attempt was made to study in detail the actual happenings which determine the origin, progress and termination of cholera outbreaks in an endemic area with special reference to the part played by cholera carriers. Material was provided for a detailed bacteriological study of vibrios isolated from cases, contacts and healthy persons living in natural village conditions; and the personal and environmental conditions conducive to the carrier state were examined.

Cholera Statistical Enquiry (*Dr. R. B. Lal*).—The epidemiology of cholera in Bengal was studied, the province being divided into five rough groups having special epidemiological features.

Cholera Clinical Enquiry (*Capt. Pasricha*).—The work carried out confirmed the previous finding that during the inter-endemic period non-agglutinating vibrios are found in the majority of cases. Morphology and smoothness or roughness of strains isolated from vibrios, their agglutinability and lysability by cholera-phage were worked out and the relationship of the strains and the phages present in the stools to the different stages of the disease and the epidemic was being studied.

The value of choleraphage prepared from freshly isolated phages grown on freshly isolated vibrios was studied.

Studies on Cholera Vibrios and Related Vibrios (*The Director, Central Research Institute, Kasauli*).—(1) Detailed qualitative and quantitative serological examination of a group of agglutinable vibrios isolated from healthy persons in the Diamond Harbour area have failed to show any difference between these vibrios and a typical vibrio isolated from a cholera case and maintained in subculture.

(2) Inagglutinable vibrios obtained from the same source are not aggutinable by cholera serum or by the sera of other vibrios employed for their examination.

(3) Animal protection experiments carried out with vaccines prepared from (*a*) typical strains from cholera cases, (*b*) agglutinating carrier strains,

(c) inagglutinating carrier strains showed the protection given by vaccines of these strains to be respectively 94%, 72% and 20%.

(4) A water vibrio from Kohat originally inagglutinable was studied for a prolonged period and found to have eventually become agglutinable showing both H and O fractions of *V. cholerae*.

(5) Studies have been made on dissociation forms of a cholera vibrio and variants have been found showing no serological relationship to the original form or to a series of other cholera variants.

(6) The comparative value of high titre sera prepared in different ways including the use of a dried " O " antigen has been studied and the sera of different types have been found to be of special value for antigenic analysis.

(7) The production of cholera in experimental animals has been investigated with negative results.

Bacteriophage in cholera (*The Director, Pasteur and Medical Research Institute, Shillong*).—The epidemiological experience in 1934 cannot be said to lead to any definite conclusions either for or against the value of bacteriophage when used alone on a large scale as a preventive of cholera and the whole question must still be regarded as not proven. The work of the enquiry this year consisted largely of basic research and the problems studied included (*i*) isolation of new choleraphage types ; (*ii*) variations in the rate of multiplication in different types of choleraphage ; (*iii*) causes for the absence of certain types of choleraphage from the brews of cholera-dysentery phage prepared for therapeutic use ; (*iv*) preparation of a medium based on papain-mutton broth to ascertain the optimum growth both of vibrios and of bacteriophage ; (*v*) growth characteristics of different types of bacteriophage using pure-line cultures ; and (*vi*) changes produced in a typical cholera vibrio strain by bacteriophage action.

The use of cholera bacteriophage in South Arcot District (*The D. P. H., Madras*).—The bacteriophage used was a mixture of choleraphage, types A, B, C, D and E, manufactured at the Guindy Institute from a passaged seed.

Although the conclusions are provisional, the prophylactic administration of phage was reported to be effective in reducing the rate of attacks from cholera, whilst the difference between bacteriophage and pro-diarrhœa mixture as curative agents against cholera was not significant.

Kala-azar.

122. (A) *Kala-azar Enquiry* (*Calcutta Tropical School*).—The two main lines of work were :—(*a*) The study of the bionomics of *Phlebotomus argentipes* with reference to their breeding habits, their range of flight, duration of life in nature and the collection and dissection of flies for an estimate of the infection rate in nature and (*b*) The obtaining of further evidence of the transmission of *Leishmania donovani* by the sandfly *P. argentipes*.

Some work was also done on the mechanism of infections in kala-azar and the study of dermal leishmaniasis.

(B) *Leishmania Vaccine Enquiry at the C. R. I., Kasauli*.—Studies of the vaccine treatment of leishmania were continued.

Leprosy.

123. *Leprosy Enquiry* (*Drs. E. Muir and J. Lowe*).—The "Leprolin" test was employed in the study of various aspects of leprosy. Pathological studies biopsy material were carried out in connection with clinical studies using

the leprolin test and it was found possible to correlate the clinical, pathological and bacteriological findings with the results of the leprolin test. A study of the pathology of rat leprosy was completed. Bacteriological work included attempts to culture the leprosy organisms by the methods of Soule and McKinley and of McKinley and Verder.

Leprolin was tried in the treatment of leprosy and in resistant cases with limited lesions it gave excellent results. Aniline dyes were also tried but results were not encouraging.

Nutrition.

124. *Nutritional Research at Coonoor.*—Major General Sir Robert McCarrison continued to direct this research. A brief summary of the main problems dealt with is given below.

Ulceration of the stomach and duodenum was studied in animals fed on diets deficient in vitamins A, B and C.

Experiments for the production of uric acid calculi in rats gave negative results. Metabolic studies were made to ascertain the extent to which cereal grains in common use in India favour or disfavour the retention of calcium, magnesium and phosphorus. Bio-physical studies of vitamin B showed that the solubility of this vitamin was influenced by pH.; a method of obtaining standard solutions of vitamin B, from the International Standard Preparation, was evolved; also a method of iodine-estimation in food stuffs which has enabled the determination of the iodine content of certain national diets of India. The chemical composition of the commoner foodstuffs of India was ascertained; the vitamin C content of over 100 common Indian food stuffs was determined by chemical means; and spectro-photometric studies made of the vitamin A content of fats and oils of Indian origin.

Other studies included the emission and absorption spectra of human, cow's, goat's and buffalo's milk; tissue culture experiments; bio-physical studies of the virus of rabies; effect of avitaminosis on the pH of organs and tissues of the body; effects of avitaminosis on the heart and a study of lathyrism.

Tuberculosis.

125. (A) *Tuberculosis Enquiry (Dr. Ukil).*—The problems studied were (*i*) tuberculosis in infancy and childhood, (*ii*) histopathology of lung tuberculosis; (*iii*) types of tubercle bacilli found in pulmonary and extra-pulmonary lesions; (*iv*) portals of entry of the tubercle bacillus; (*v*) a sensitive culture medium for tubercle bacilli; and sunlight experiments.

(B) *Tuberculosis Enquiry (Dr. Soparkar).*—The filterable phase of the tubercle bacillus was studied. The enquiry was closed in May.

Vaccines.

126. *Anti-rabic Vaccine Enquiry at the Pasteur Institute of India, Kasauli.*—Experiments were continued on human beings to test the value of anti-rabic serum as an adjunct to vaccine treatment. Animal experiments were conducted; (*i*) to determine the effect of storage in the antigenic value of carbolised 5% Paris sheep vaccine; (*ii*) to ascertain the immunity conferred on rabbits surviving after subdural infection with rabies fixed virus, which had been acted upon by anti-rabic serum at 37°C. for varying periods from 1 to 8

hours in the incubator ; (*iii*) to compare the relative pre-infectional immunising value in monkeys of carbolised 5% Paris sheep vaccine administered alone and when supplemented by fresh live fixed virus ; (*iv*) to ascertain the immunising value of rabies fixed virus inactivated by the combined action of methylene blue and sunlight ; (*v*) to determine the neutralising action of anti-rabic serum on rabies street virus when the two are brought in contact in the form of an emulsion ; (*vi*) to test the neutralising action of buffalo anti-rabic serum when placed in contact with fresh fixed virus ; (*vii*) to ascertain if an immunity in keeping with that produced against yellow fever can be conferred on monkeys against rabies with one immunising dose of anti-rabic serum *plus* live fixed virus, (*viii*) to test the immunising action of unconcentrated anti-rabic serum when infiltrated into the tissues surrounding the site of infection ; (*ix*) to compare the relative immunising values of carbolised 5% Paris fixed virus vaccine used singly or supplemented by fresh live virus ; and of fixed virus inactivated by methylene blue and sunlight ; (*x*) to compare the immunising values of vaccine prepared from brains of sheep with those prepared from spinal cords.

Helminthology.

127. (A). *Helminthological Enquiry* (*Dr. Maplestone*).—Work on *Gnathostoma spinigerum* and its effect on cats was continued. Other investigations were begun on the epidemiology of ascaris infection and on skin reactions to ascaris extracts.

(B). *Dracontiasis and Filariasis Enquiry* (*Dr. Sundar Rao*). *Guinea Worm.*—Surveys of a few endemic areas in the Bombay Presidency and in Vizianagram State were continued. Experiments *in vitro* to observe the effects on guinea worm embryos were carried out with neostibosan, fouadin, soamin, berberine sulph., acriflavine and watery extract of bamboo shoots.

Filariasis.—Work on the estimation of protein fractions in blood sera in cases of filarial infection was completed. Feeding experiments of mosquitoes under controlled conditions of temperature and humidity were continued. Berberine acid sulphate, caesalpina bonducella, oleum chenopodium carbarsone and aolan were tested for their efficacy in combating filarial infection.

Miscellaneous.

128. *Maternal Mortality and Morbidity in Child-birth* (*Dr. Mudaliar*).—A systematic investigation into the bacteriology of puerperal sepsis was begun in Madras, with a view to establish, if possible, some correlation between the bacteriological findings and the different therapeutic methods adopted.

129. *Enquiry on the Bionomics and Early Stages of Phlebotomus* at the C. R. I., Kasauli, and at Karnal :—Further studies were made of the stage or stages in which phlebotomus over-winters ; the longevity of fed and unfed sandflies (*P. papatasi*) under different humidity conditions ; trial of certain insecticides against sandfly larvae breeding in crevices and under heaps of stones.

130. *Protozoal Parasites Enquiry* (*Lt.-Col. H. E. Shortt, I.M.S.*).—The life cycle of *Babesia canis*, except the earliest stages, was worked out in detail, as it occurs in the dog tick *Rhipcephalus sanguineus*. Preliminary experiments on the transmission of oriental sore offered strong presumptive evidence that *P. sergenti* is the vector in the Punjab. For the first time in India *L. tropica* was successfully cultured from the dog ; a paper on this case was published in the I. J. M. R. (Vol. XXII, No. 2).

Further experiments were made with *Triatoma rubrofasciata* and *Trypanosoma ruzi*. Other work included trials with the oriental sore vaccine prepared by Dr. Ray.

131. *Cancer in India (Dr. Vishwanath)*.—Statistics of indoor departments of hospitals and pathological laboratories in medical schools and colleges were studied in the U. P., Punjab, Delhi and B. and O.

132. *Skin Diseases Enquiry (under the Director, School of Tropical Medicine, Calcutta)*.—Further studies were made of actinomycosis, tinea imbricata, favus, ringworm, psoriasis, molluscum contagiosum and pityriasis rubra.

133. *Indigenous Drugs Enquiry (Lt.-Col. Chopra, I.M.S.)*. The effectiveness of emetine, carbarsone and gavano, as remedies of intestinal amœbiasis was tested. Research was continued in connection with quinine, atebrin and malarcan, on both monkey and human malaria.

Other work was (*i*) in connection with snake venom, *Indian daboia* with a view to find an effective treatment; (*ii*) on the changes in the physical properties of the blood sera in health and disease; (*iii*) an electrocardiograph study of the effects of various drugs on the heart; (*iv*) the effectiveness of the following indigenous drugs; *Alangium lamarkii, Antiaris toxicaria, Veronia anthelmintica, Picrorhiza Kurroo,* Benth, *Erythrina indica, Hygrophilla spinosa, Sansivieria zeylanica, Pongamia glabra, Bryophyllum calycinum,* Salis, *Solanum indicum* and *Rheum emodi*.

134. *Drug Addiction Enquiry (Lt.-Col. Chopra, I.M.S.)*.—The main aspects of this research were the study of (*i*) the habitual administration of opium to infants; (*ii*) the physical and mental effects of the opium habits, (*iii*) blood changes in opium addicts; (*iv*) determination of the incidence of hemp drugs addiction; (*iv*) habituation to new drugs, *e.g.* barbitol and allied drugs.

135. *Statistical Enquiry*.—This enquiry under the Public Health Commissioner with the Government of India continued to prepare photographic copies of charts showing weekly deaths from cholera, smallpox and plague for the period, 1920-32, in all the major provinces.

SECTION IX.

MEDICAL INSTITUTIONS.

I.—Hospitals and Dispensaries.

A.—British India.

General and Statistical.

136. At the end of 1934 there were 6,597 hospitals and dispensaries in British India following the modern system of treatment—an increase of 49 over 1933. On the average 41,800 persons were served by each such institution ; the averages for rural and urban institutions being 58,459 and 11,914 persons respectively. Of these institutions, 5,202 or 79% were maintained either by Government, local authorities or both and only a small number, *i.e.*, 545 or 8% were financed, managed and controlled by private organisations. In rural areas facilities for medical relief remain very inadequate, the small province of Coorg standing out as the area in which rural medical relief is most developed.

Table IX (i) gives institutions for medical relief by areas and population for 1933 and 1934.

The meaning of the various classes of institutions for medical relief is given in the footnote*.

TABLE IX (i).

Hospitals and dispensaries.

	Classes I, III and IV.		Classes II and VI.		Class V		Total.		Average population served per institution, 1934.
	1933.	1934.	1933.	1934.	1933.	1934.	1933.	1934.	
British India . .	**5,154**	**5,202**	**861**	**850**	**533**	**545**	**6,548**	**6,597**	**41,800**
N.-W. F. P. . .	67	70	35	35	7	10	109	115	21,157
Punjab . . .	778	780	187	181	8	8	973	969	25,473
Delhi . .	25	25	2	2	...	...	27	27	24,747
U. P. . . .	481	493	103	110	77	83	661	686	73,702
B. & O. . . .	536	540	84	84	66	66	686	690	56,594
Bengal . . .	974	1,012	119	119	175	179	1,268	1,310	38,807
C. P. . . .	229	230	50	53	50	53	329	336	48,327
Bombay . . .	414	414	80	79	40	40	534	533	42,533
Madras . . .	1,165	1,186	77	76	94	94	1,336	1,356	34,773
Coorg . . .	11	11	...	...	3	3	14	14	11,728
Assam . . .	208	210	43	43	7	7	258	260	31,529
Burma . . .	231	231	71	68	2	2	304	301	41,613
Baluchistan . .	35	...	10	...	4	...	49	...	...

Table IX (ii) gives the distribution of these institutions in rural and urban areas in the different provinces (excluding Delhi Province), and the populations served by them.

In these institutions the indoor accommodation for males is nearly double that for females and children. Institutions of Classes II, V and VI and subsidised dispensaries generally provide outdoor treatment only and totalled

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obreviations :—

M. . . . Male.
F. . . . Female.
R. . . . Rural.
U. . . . Urban.
p.m. . . per mille.
C. P. . . Central Provinces and Berar.
U. P. . . United Provinces of Agra and Oudh.
B. & O. . . Bihar and Orissa.
I. G. C. H. . Inspector-General, Civil Hospitals.
P U. O. . Pyrexia of uncertain origin.

*
Class I.—State-public.
Class II.—State-special.
Class III.—Local, municipal fund and subsidised dispensaries.
Class IV.—Private-aided.
Class V.—Private non-aided.
Class VI.—Railways.

TABLE IX (ii).

Hospitals and dispensaries.

	Classes I, III and IV.		Classes II and VI.		Class V.		Total.		Grand Total.	Average population served by each institution.	
	R.	U.	R.	U.	R.	U.	R.	U.		R.	U.
British India	3,553	1,609	347	485	351	193	4,251	2,287	6,538	58,459	11,914
N.-W. F. P.	34	21	6	13	3	6	43	40	83	49,011*	8,138*
Punjab	592	188	98	83	4	4	694	275	969	30,852	11,900
U. P.	286	207	19	91	62	21	367	319	686	127,107	12,261
B. & O.	467	73	43	41	54	12	564	126	690	66,679	11,453
Bengal	595	417	26	93	105	74	726	584	1,310	65,171	6,032
C. P.	112	118	12	41	37	16	161	175	336	90,012	9,976
Bombay	157	257	27	52	17	23	201	332	533	91,372	12,966
Madras	994	192	52	24	61	33	1,107	249	1,356	36,772	25,885
Coorg	9	2	...	...	3	...	12	2	14	12,883	4,795
Assam	171	39	21	22	5	2	197	63	260	40,586	3,209
Burma	136	95	43	25	...	2	179	122	301	62,032	11,655

* Excluding 32 dispensaries in the Agencies.

14,283 or 20% while 57,701 beds or 80% of the total were in institutions of classes I, III and IV providing indoor and outdoor accommodation. Table IX (iii) shows the numbers of beds available in the different provinces by sexes, children being included with females.

TABLE IX (iii).

Numbers of beds.

	All classes of Institutions.			State-public, local fund and private-aided hospitals and dispensaries.		
	Males.	Females and children.	Total.	Males.	Females and children.	Total.
British India . .	**46,034**	**25,950**	**71,984**	**35,673**	**22,028**	**57,701**
N.-W. F. P. . .	1,652	499	2,151	822	397	1,219
Punjab . . .	6,304	4,094	10,398	5,415	3,971	9,386
Delhi . . .	330	506	836	272	506	778
U. P. . . .	6,310	2,951	9,261	4,295	2,677	6,972
B. & O. . . .	3,898	1,939	5,837	2,706	1,499	4,205
Bengal . . .	6,729	2,872	9,601	4,271	2,371	6,642
C. P. . . .	1,811	1,132	2,943	1,334	854	2,188
Bombay . . .	5,062	3,522	8,584	4,238	2,972	7,210
Madras . . .	6,452	5,935	12,387	6,150	4,508	10,658
Coorg . . .	88	66	154	88	66	154
Assam . . .	1,260	386	1,646	780	313	1,093
Burma . . .	6,138	2,048	8,186*	5,302	1,894	7,196

* Excluding 38 beds for children and 8 special beds.

Table IX (iv) shows the numbers of patients treated during 1934 in various classes of institutions :—in classes I, III and IV as indoor and outdoor patients and for all classes according to sex, children being again included with females. The low figures of females treated by no means connote relative healthiness of the female population but is ascribable partly to the prevailing *purdah* system and partly to the inadequacy of indoor accommodation for females.

TABLE IX (iv).

Patients treated.

	Classes I, III and IV.			All Classes.		
	Indoor.	Outdoor.	Total.	M.	F.	Total.
British India .	**1,098,144**	**64,384,559**	**65,482,703**	**48,337,195**	**26,547,567**	**75,543,813**
N.-W. F. P. .	29,432	1,894,520	1,923,952	1,580,252	599,028	2,179,280
Punjab . .	206,810	13,817,689	14,024,499	9,485,273	5,907,232	15,392,505
Delhi . .	17,178	874,525	891,703	592,146	335,975	928,121
U. P. . .	123,194	7,459,585	7,582,779	6,164,470	2,929,259	9,093,729
B. & O. . .	75,511	5,553,960	5,629,471	4,987,301	2,042,393	7,029,694
Bengal . .	118,751	7,511,409	7,630,160	7,045,595	2,929,776	9,975,371
C. P. . .	36,031	2,902,277	2,938,308	2,364,775	1,068,503	3,433,278
Bombay . .	115,775	2,982,840	3,098,615	1,977,327	1,121,288	3,847,926
Madras . .	231,623	16,006,374	16,237,997	10,246,260	8,152,565	18,398,825
Coorg . .	4,996	295,719	300,715	210,662	98,864	309,526
Assam . .	16,848	2,108,125	2,124,973	1,716,761	624,283	2,341,044
Burma . .	121,995	2,977,536	3,099,531	1,966,373	738,401	3,363,825*

* Including 659,051 children, details according to sex not being available.

Facilities for the treatment of women exist in all classes of institutions but the numbers of hospitals and dispensaries, exclusively for women, are not very many ; those maintained or aided by Government or by local funds numbered 78 in the U. P., 41 in Madras Presidency including 4 in Madras city, 40 in the Punjab, 14 in Bengal including 6 in Calcutta, 11 in the C. P., 8 in Bombay Presidency including 8 in Bombay city, 5 each in B. & O. (Patna 2) and Burma including 3 in Rangoon and 4 in N.-W. F. P. Of these 206 institutions, 30 were state-public, 99 local and municipal fund, 74 private-aided and 3 others. These hospitals and dispensaries are to be found chiefly in headquarter or other urban centres and some provide only outdoor treatment.

The numbers of beds for females in general and women's hospitals and dispensaries of classes I, III and IV in ten provinces are given in Table IX (v).

TABLE IX (v).

	General hospitals.	Women's hospitals.	Total.	Women's hospitals. Total indoor patients treated.	Women's hospitals. Indoor daily average.
Total	**15,873**	**5,583**	**21,456**	**134,813**	**4,438**
N.-W. F. P.	283	114	397	2,903	79
Punjab	2,676	1,295	3,971	24,729	991
U. P.	1,293	1,384	2,677	23,219	870
B. & O.	1,284	215	1,499	3,429	158
Bengal	1,969	402	2,371	10,551	230
C. P.	552	302	854	8,057	291
Bombay	2,205	767	2,972	24,765	649
Madras	3,536	972	4,508	33,422	1,066
Assam	313	..	313	..	..
Burma	1,762	132	1,894	3,738	104

Surgical Operations.—Nearly 90% of the total surgical operations were performed in state-public, local fund and private-aided institutions. Table IX (vi) shows the numbers of operations by provinces.

TABLE IX (vi).

	Classes I, III and IV. 1934.	All Classes. 1934.
British India	**2,475,214**	**2,751,968**
N.-W. F. P.	103,481	123,288
Punjab	569,671	661,951
Delhi	30,776	31,340
U. P.	321,216	361,039
B. & O.	273,689	334,868
Bengal	195,342	208,094
C. P.	103,200	113,543
Bombay	154,018	168,048
Madras	571,988	583,521
Coorg	4,499	4,522
Assam	21,929	23,708
Burma	125,405	138,046

Tables IX (vii) and IX (viii) give figures of income and expenditure for 1934.

TABLE IX (vii).

	Total income Classes I, III and IV.	Contributions by— Government.	Municipal and local funds.
	Rs.	Rs.	Rs.
British India	**4,30,07,724**	**1,78,51,651**	**1,38,62,288**
N.-W. F. P.	6,64,890	3,60,607	249,917
Punjab	42,97,025	17,77,669	20,49,761
Delhi	7,79,907	3,06,443	2,32,250
U. P.	35,44,940	8,68,298	18,48,992
B. & O.	32,91,196	9,41,717	14,66,845
Bengal	68,63,269	20,14,463	24,24,022
C. P.	25,79,304	6,99,898	2,49,395
Bombay	60,29,726	25,41,457	19,28,186
Madras	80,22,534	52,50,247	18,50,095
Coorg	1,03,798	48,022	48,612
Assam	9,48,077	7,19,885	45,470
Burma	58,83,058	23,22,945	14,68,743

TABLE IX (viii).

	Total expenditure.	Expenditure on— Medical officers.	Nurses.	Diet.	Medicines.
	Rs.	Rs.	Rs.	Rs.	Rs.
British India	**3,71,94,518**	**95,73,887**	**36,52,649**	**30,34,690**	**49,25,825**
N.-W. F. P.	6,54,211	1,85,595	32,452	30,059	1,07,623
Punjab	40,50,289	13,03,548	1,96,604	1,17,825	5,45,141
Delhi	7,83,873	1,16,230	1,48,139	43,887	1,19,582
U. P.	30,34,401	8,51,703	2,13,862	1,48,687	4,51,257
B. & O.	27,04,328	7,36,777	1,27,491	1,44,451	4,70,009
Bengal	58,62,407	11,43,939	6,28,359	5,51,224	7,66,849
C. P.	12,40,779	4,23,938	94,198	17,172	1,58,562
Bombay	55,80,410	12,98,473	6,29,311	4,41,212	6,25,626
Madras	80,86,217	19,76,572	9,30,410	10,45,615	11,58,989
Coorg	1,03,798	36,448	8,211	9,317	19,651
Assam	8,02,673	3,26,858	1,05,030	44,837	1,26,034
Burma	42,91,132	11,73,806	5,38,582	4,40,404	3,76,502

During 1934, medical personnel in the different provinces comprised Indian Medical Service Officers 179, Indian Medical Department Officers 90, Women's Medical Service Officers 32, salaried medical graduates 1,750 and licentiates 6,437. The provincial distribution is given in Table IX (ix).

TABLE IX (ix).

	I. M. S.	W. M. S.	I. M. D.	Salaried graduates.	Licentiates.
Total	**179**	**32**	**90**	**1,750**	**6,437**
N.-W. F. P.	9	2	14	22	81
Punjab	24	..	18	182	938
Delhi	2	12	3	19	27
U. P.	16	8	8	220	564
B. & O.	12	2	6	181	727
Bengal	23	..	13	390	1,310
C. P.	8	6	4	83	329
Bombay	16	..	13	220	518
Madras	31*	2	..	309	1,303
Coorg	..	..	..	1	17
Assam	12	..	4	43	283
Burma	26	..	7	80	340

* Including I. M. D. Officers.

Honorary Medical Staff.—The practice of associating selected private medical practitioners with the staffs of Government hospitals in an honorary capacity is gaining in popularity throughout the provinces. Such practitioners are appointed either as honorary physicians or surgeons or assistant physicians or surgeons or are employed in other specialist posts, clinical or educational. In addition to this, newly qualified medical graduates and licentiates are being employed in increasing numbers as honorary house surgeons and assistant house surgeons in headquarters hospitals. There were during 1934 661 medical graduates and 256 medical licentiates rendering honorary services in the various provinces mainly in provincial and district headquarter hospitals. Table IX (x) gives distribution of these doctors by provinces.

TABLE IX (x).

Honorary Medical Staff.

	Graduates.	Licentiates.
Total	**661**	**256**
N.-W. F. P.	6	4
Punjab	16	3
Delhi	..	..
U. P.	40	24
B. & O.	14	6
Bengal.	240	89
C. P.	20	3
Bombay	155	10
Madras	148	99
Coorg	..	5
Assam	4	3
Burma	18	10

Nursing Services.—Table IX (xi) shows the numbers of nurses employed in hospitals in rural and urban areas. The slow growth of nursing services in rural areas is very noticeable.

TABLE IX (xi).

	Rural.	Urban.	Total.
Total	**211**	**3,486**	**3,697**
N.-W. F. P.	10	85	95
Punjab	5	275	280
Delhi	..	123	123
U. P.	8	307	315
B. & O.	15	194	209
Bengal	17	788	805
C. P.	22	113	135
Bombay	22	624	646
Madras	53	530	583
Coorg	3	4	7
Assam	14	10	24
Burma	42	433	475

Progress in the development of nursing service is slow largely on account of the lack of suitable candidates and the relatively low esteem in which the profession of nursing is held among middle class Indians. Owing to this shortage of trained nurses, salaries are relatively high.

Table IX (xii) gives the numbers of in-patients together with the cost of nursing them.

TABLE IX (xii).

	Indoor patients in classes I, III and IV.	Expenditure on nursing. Total.	Per case treated.
		Rs.	Rs. A. P.
Total	1,094,406	35,54,726	3 4 6
N.-W. F. P.	29,432	32,432	1 1 8
Punjab	206,810	1,96,604	0 15 9
Delhi	17,178	1,48,139	8 10 3
U. P.	123,194	2,13,862	1 12 0
B. & O.	75,511	1,27,491	1 11 0
Bengal	118,751	6,28,359	5 4 8
C. P.	36,031	94,198	2 9 9
Bombay	715,775	6,29,311	5 7 0
Madras	231,623	9,30,410	4 0 3
Coorg	4,996	8,211	1 10 3
Assam	16,848	1,05,030	6 4 0
Burma	118,257	4,40,679	3 12 0

In *Bengal Presidency* the Nurses Registration Act, 1934, was passed during the year but was not enforced. In the Calcutta hospitals existing arrangements for nursing fall far short of the actual requirements and the local Government has been considering a proposal for the training and employment of more nurses. Table IX (xiii) shows the numbers enployed in Calcutta during 1934.

TABLE IX (xiii).

	No. of Nurses.			Average number of beds per nurse.		
	1932.	1933.	1934.	1932.	1933.	1934.
Presidency General Hospital	83	99	100	2	2	2
Lady Dufferin Victoria Hospital	50	40	42	3	3	3
Medical College Hospitals	168	179	174	4	4	4
Carmichael Hospital for Tropical Diseases	20	20	20	4	4	4
Calcutta Medical School Hospital	51	58	61	5	5	5
Howrah General Hospital	21	21	21	6	6	7
Mayo Hospital	8	8	8	11	11	11
Chittaranjan Hospital	25	26	37	13	12	13
Sambhunath Pandit Hospital	25	25	25	16	13	11
Campbell Hospital	52	52	52	26	30	36
Sree Visudhanand Saraswati Marwari Hospital	25	25	25	9	9	9
Carmichael Medical College Hospitals, Belgachia	51	58	61	5	5	5

Outside Calcutta, nursing arrangements were reported as highly unsatisfactory on account of shortage of funds and lack of trained nurses; in only 14 hospitals were qualified nurses employed at all; in other institutions untrained female attendants, *dais*, ward servants, compounders, friends or relatives

attended patients. Approved training centres for junior nurses existed at 8 hospitals in the *muffassal.*

In *Bihar and Orissa* qualified nurses are employed in only a few district headquarters' hospitals notably those at Cuttack, Patna, Ranchi and Darbhanga ; elsewhere attendance on the sick is generally entrusted to ward attendants. Examinations for the Diploma in Nursing are held bi-annually by the provincial examination board and during the three years 1932-34, 16 Anglo-Indian and 12 Indian candidates were successful. The Nurses Registration Act was passed in 1935, *i.e.* after the close of the year under review.

In *Bombay Presidency* a number of nursing associations affiliated to the Bombay Presidency Nursing Association were at work. The Central Association prescribes the curriculum, conducts examinations, awards diplomas and maintains a register of all qualified nurses. A Bill for the registration of nurses, midwives, etc., was under consideration.

In the *United Provinces* the Nurses Registration Act has been enforced but rules thereunder have not yet been framed. Women's hospitals employ a considerable number of staff nurses and also utilise female compounders who have had an elementary training in midwifery and nursing. In district hospitals, the employment of male nurses has been popular. The I. G. C. H. considers that there is need for better nursing facilities, particularly in the *sadr* hospitals and women's hospitals.

Of the 280 European, Anglo-Indian and Indian nurses in the *Punjab* only five were employed in rural areas. During the year 50 women obtained the Diploma in Midwifery and 43 nurses and 290 indigenous *dais* were awarded certificates ot the Punjab Central Midwives Board.

In the *Central Provinces* only the main hospitals of Wardha and Akola employed staff nurses but the numbers were inadequate. Training classes for probationer nurses were however held at the Irwin Hospital, Amraoti, the main hospital, Raipur, Mayo Hospital, Nagpur and the Victoria Hospital, Jubbulpore.

In *Madras Presidency* the nursing service is more popular and many suitable candidates are said to be seeking training, each training centre having a waiting list.

In *Assam* the nucleus of a nursing service has existed since 1931 and trained staffs are now available at Gauhati, Dibrugarh, Nowgong and Silchar. A comprehensive scheme of nursing has been worked out for the new hospital for women and children, Shillong, and it was proposed to appoint nursing sisters for the hospitals at Sylhet and Jorhat.

Burma takes a high position amongst the provinces of India in respect of the numbers and quality of its nurses and midwives. About 96 probationers are constantly under training in the Rangoon General Hospital, whilst 42 nurses and 68 midwives obtained certificates of the Burma Midwives and Nurses Council during 1934, and those employed in hospitals totalled 369.

Subsidised Practitioners.—During the last decade considerable progress has been made in extending medical relief to remote rural tracts, notably in the Punjab and Madras Presidency by means of subsidies to private practitioners. The Punjab scheme is outlined in the following extract from the I. G. C. H.'s report :

" A private practitioner is placed in charge of a dispensary and is given Rs. 25 per mensem by way of a subsidy. The practitioner thus placed in charge of the dispensary

is not liable to be transferred to another dispensary without his consent but in other respects is subject to the same conditions of service as the whole time medical officers in charge of rural dispensaries. A whole time dispenser who is an employee of the District Board is appointed to the dispensary on a salary of Rs. 25 per mensem and a grant of Rs. 500 per annum is given for drugs and instruments. The total cost of such a dispensary is thus Rs. 1,100 against Rs. 2,500 that of a rural dispensary under the existing scheme. The practitioner has to make his own arrangements for menial servants and for any miscellaneous expenditure connected with the dispensary. He is also entitled to charge for medicines supplied to patients except to the very poor in accordance with a scale which lays down the maximum chargeable in this manner."

In some other provinces also schemes of medical relief on similar lines have been introduced to suit local conditions and requirements.

North-West Frontier Province.

137. During 1934 six new dispensaries were opened—3 in rural, 2 in urban areas and one in the agencies. The local Government in their resolution on the working of hospitals and dispensaries in this province says :

" Although Government has been unable through lack of funds to allot all the money it would like for expansion in the Medical Department, the small but steady increase in the number of dispensaries has been maintained."

Of the 29,432 indoor patients treated in classes I, III and IV institutions 878 died, giving a death rate of 3%. The four female hospitals at Peshawar, Dera Ismail Khan, Bannu and Kohat were maintained from local or municipal funds, and dealt with 2,903 in door and 968,496 out door cases. Eight subsidised outdoor dispensaries treated 58,597 patients. Visits by medical officers in charge of local dispensaries to adjoining villages continues to gain in popularity.

Diseases treated included malaria 544,696 cases, eye affections 219,275, ulcerative inflammation 213,156, respiratory diseases 169,951, skin diseases 119,771, diseases of ear 91,583, intestinal disease 80,008, diseases of the stomach 78,816, anaemia 26,063, dysentery 26,045, pyrexia of uncertain origin 18,830, pneumonia 9,082, rheumatic fever 7,840, syphilis 7,571, tubercle of lungs 6,429 with 74 deaths, other tubercular disease 4,974 with 56 deaths, roundworms 4,083, influenza 2,221, gonococcal infection 2,078, enteric fever 1,845, ankylostomiasis 947, diabetes 626, scurvy 302, mental disease 275, leprosy 90 and relapsing fever 41.

Punjab.

138. Nine dispensaries were opened, 7 in rural and 2 in urban areas, and 9 including 8 rural and 1 urban, were closed. Of 375 dispensaries scheduled to be opened for rural inhabitants, only 15 now remain to be set up. As in 1933, the number of subsidised dispensaries was 10. The number of class III institutions (local and municipal fund), 699, was the largest on record, except in 1931. With the " Provincialisation " of the civil hospital, Rohtak, during 1934, the number of such provincialised headquarters institutions totalled 47, and the local Government proposes to provincialise 66 more district and *tehsil* headquarters hospitals and dispensaries.

In almost all general hospitals, separate indoor accommodation exists for the treatment of women.

In addition to 42 women's hospitals there were 43 special wards under lady doctors, exclusively for women.

Considerable overcrowding was reported in classes I, III and IV institutions which are well known surgical centres throughout the cataract season. The 360 rural dispensaries treated 4,807,540 patients.

Diseases of the eye continue to head the list with 3,173,995 cases, followed by malaria 2,174,764; diseases of digestive system 1,109,827, ulcerative inflammation 1,089,189, skin diseases 1,073,787, diseases of stomach 588,516, intestines 409,055, dysentery 207,523—amoebic 102,839 and bacillary 104,684, diseases of nose 168,277, diarrhoea 154,197, rheumatic fever 55,085, enteric fever 22,841, tubercle of lungs 16,622, other tubercular diseases 15,455, syphilis 17,703, gonococcal infection 13,602, other "V. D." 2,892. Influenza was the cause of 37,388 cases, kala-azar 38, leprosy 519, meningococcal infection 731, pneumonia 54,840, typhus 283, louse borne 1, the remaining 283 being unknown vector, pyrexia of uncertain origin 106,130, guineaworm disease 2,518 and filariasis 793. Opium poisoning was treated in 344 cases and other poisons in 3,468. Labour cases totalled 12,116.

The selected operations numbering 71,739, included 28,411 for removal of cataract on 23,724 patients of whom 96·9% obtained good vision; amputations 1,200; litholapaxy 1,143; obstetric 2,696; lithotomy 914; hernia 756; abdominal sections 222; cystotomy 160, liver abscess 128; and appendicitis 217.

The Punjab dental hospital, Lahore, provided treatment for 23,704 cases, including 14,942 old cases. In association with this hospital, the deMontmorency College of dentistry was opened, and 12 medical graduates and 6 licentiates were given post-graduate training.

The chief sources for the supply of qualified women doctors are the Lady Hardinge Medical College, Delhi, for which the Punjab Government nominate 7 students, and the Punjab Medical School for women, Ludhiana, whilst a system of coeducation is in force in the King Edward Medical College, Lahore, and the Medical School, Amritsar, 10 seats in the former and 15 in the latter institution being reserved for female students.

Delhi.

139. Delhi Municipal Committee maintains civil (Dufferin) hospital and 8 branch dispensaries: New Delhi Municipality meets the cost of the Willingdon Hospital, the Willingdon Nursing Home and 2 other branch dispensaries; while 5 dispensaries are financed by the district board. A venereal diseases hospital was opened in Delhi city, and an isolation hospital at Kingsway. The projected new Irwin Hospital, on which work has begun, will have 303 beds.

The principal diseases in order of frequency were:—Malaria 129,063 cases, influenza 97,371, diseases of the eye 84,679, digestive system 68,098, ulcerative inflammation 62,759, skin 59,104, ear 43,215, areolar tissue 39,578, intestines 32,224, stomach 20,107, anaemia 13,069, dysentery 11,762 and "V. D." 9,444 including gonorrhoea 4,902 and syphilis 4,542. Cases of opium poisoning numbered 36 and of other poisoning 566, of these 5 each proving fatal. Of 1,054 cases of normal and 538 of abnormal labour, 10 and 25, respectively were fatal.

United Provinces of Agra and Oudh.

140. Thirty-three rural and 12 urban institutions were opened; 3 and 10, respectively, were closed; and 5 and 2 were transferred to other departments or classes. The cadre of the provincial medical service totalled 97. The scheme

for post-graduate studies for provincial subordinate medical service officers sanctioned by Government and for an advanced course of studies at the Agra Medical School had to be postponed owing to financial stringency. The subsidies were continued to local boards for 24 qualified medical practitioners settled in rural areas, while subsidised dispensaries in hill tracts numbered 48. The Colvin and Manohar Das eye hospitals at Allahabad were provincialised.

The appointment of honorary physicians and surgeons at headquarters and *muffassal* hospitals was encouraged. Six dental clinics were at work under honorary dentists at district headquarters hospitals at Benares, Jhansi, Dehra Dun, Meerut, Bareilly and Lucknow. The scheme for the extention of medical relief to women by women doctors in small towns and rural areas continued to work satisfactorily.

The treatment of venereal diseases was carried out in hospitals and dispensaries on improved modern lines. The skin dispensaries treating leprosy at Cawnpore, Benares and Lucknow continued to do useful work under the auspices of the B. E. L. R. A. (Indian Council).

Malaria was, as usual, the chief cause of sickness, 1,091,195 cases being treated. Next in order of frequency were skin diseases 970,679 cases ; diseases of the eye 746,635 ; ear 735,854; respiratory system 688,289 ; digestive system 595,237 ; ulcerative inflammation 555,395 ; scabies 330,809 ; diseases of areolar tissue 283,940 ; trachoma 257,949 ; diseases of stomach 254,243 ; pyrexia of uncertain origin 220,629 ; rheumatic fever 197,385 ; diseases of teeth and gums 193,389 ; generative system 182,162 ; nervous system 152,313 ; intestines 123,318 ; bones and joints 119,499 ; goitre 106,891 ; influenza 105,892 ; pneumonia 27,509 ; tuberculosis of lungs 22,205 ; other tubercular diseases 17,082 ; leprosy 8,533 ; relapsing fever 2,280 ; kala-azar 921 and c. s. fever 786. Of 1,111 cases of typhus fever 117 were tick borne, 16 louse borne, and 978 undetermined.

Bihar and Orissa.

141. Of the 6 new dispensaries opened in rural areas 2 were " subsidised ", 2 maintained by local and municipal funds, one a private institution and one a railway dispensary. Medical personnel in this province comprised 24 I. M. S. officers, 3 military and 113 civil assistant surgeons and 136 civil subassistant surgeons.

Most hospitals have inadequate nursing arrangements. The present staff at Patna Medical College Hospital includes one matron, 20 nursing sisters and staff nurses, 26 anglo-Indian and 14 Indian probationers ; at Cuttack general Hospital, one Reverend Mother, 2 nuns, 5 nursing sisters and 15 probationers; at Darbhanga medical School hospital, 5 nurses and 4 probationers ; at Ranchi European Hospital, 3 nurses and at the Ranchi *Sadr* hospital 3 European and 3 Indian nurses. Examinations for the Diploma in Nursing are held twice a year by the Provincial Medical Examination Board.

Arrangements for medical aid to women are particularly inadequate in the rural areas, the chief handicap being the lack of funds. Separate hospitals for women exist at Patna, Gaya, Ranchi, Monghyr, Bettiah, Bhagalpur, Hazaribagh and Chakradharpur ; special wards for women are also attached to general hospitals ; in almost all *sadr* hospitals and in most sub-divisional hospitals qualified lady doctors are attached to the staffs.

Malaria was the cause of 1,016,176 cases, diseases of the skin 952,673, digestive system 617,576, ear 544,775 and eye 431,160, ulcerative inflammation 423,963, diseases of the respiratory system 376,447, intestines 196,641, stomach 170,080 and areolar tissue 164,097, dysentery 141,325, diseases of nerves, spinal cord, brain and meningitis 135,808, roundworms 116,373, rheumatic fever

105.430, influenza 102,112 and diseases of ductless or endocrine glands 100,202. Opium poisoning cases numbered 321 with 13 deaths and other poisoning cases 7,197 of which 28 were fatal. Cases of normal labour numbered 4,687 and abnormal labour, 1,931 with 37 and 207 deaths respectively. Pyrexia of uncertain origin was the cause in 76,202 cases ; kala-azar in 58,547 ; syphilis in 38,697 ; gonorrhoea in 25,895 ; tuberculosis of lungs in 18,383 with 204 deaths ; pneumonia in 12,994 ; leprosy in 8,766 : enteric fever in 8,537 with 134 deaths ; other tubercular diseases in 6,774 with 68 deaths ; relapsing fever in 1,109.

The Radium Institute, Patna, provided beds for 12 males and 6 females, in addition to a set of cabins for treatment of patients. The local Government and the provincial branch of the Indian Red Cross continued to give a special grant for the treatment of venereal diseases. The Government grant of Rs. 10,000 for kala-azar was continued.

Bengal.

142. Excluding the Surgeon General, the medical personnel included 23 I. M. S. officers, 13 I. M. D. officers, 390 civil assistant surgeons and 1,310 sub-assistant surgeons.

Calcutta.—There were 44 hospitals and dispensaries at end of the year, 38 being general and 6 exclusively for women. Only 23 institutions provided indoor accommodation comprising 3,721 beds of which 2,341 were for males and 1,380 for females. Cases treated totalled 962,953 (males 676,191 and females 286,762). The more important causes of morbidity were eye diseases 87,496 cases : malaria 63,007 ; influenza 34,646 ; pyrexia of uncertain origin 23,463 ; dysentery 17,269 ; roundworms 16,718 ; gonorrhoea 16,598 ; syphilis 15,120 ; tubercle of lungs 13,745 ; kala-azar 6,195 ; beri-beri 6,054 ; other tubercular diseases 4,707 ; pneumonia 3,559 ; enteric fever 2,593 ; ankylostomiasis 1,466 ; diabetes 1,438 ; leprosy 1,109 ; relapsing fever 186 and scurvy 79.

The Medical College group of hospitals provide a special outdoor department for tuberculosis of the lungs and treated 984 indoor cases with 111 deaths and 15,471 outdoor patients. There is an eye infirmary where 36,156 patients attended. The 3 leper hospitals at Gobra (Calcutta), Raniganj (Burdwan) and Bankura continued to function. At Gobra, there is a ward for insane lepers.

Surgical operations totalled 57,797, with 1,176 deaths.

Government spent Rs. 17,04,181 and local bodies Rs. 7,32,793 on the maintainence of medical institutions ; the expenditure on medical officers amounted to Rs. 3,99,164, on nurses Rs. 5,59,577 and on diet Rs. 3,99,364.

Honorary medical officers were reported to be doing valuable work in the state hospitals. There were altogether 46 house surgeons and physicians, 5 anaesthetists, 6 clinical tutors and numerous clinical assistants, as well as 18 medical officers in the Medical College hospitals and 12 in the Campbell hospital.

A Dental Registration Act for Calcutta was under consideration.

Muffassal.—A total of 1,266 hospitals and dispensaries functioned in the Presidency outside Calcutta and included 18 state-public, 42 state-special, 647 local fund, 68 village, 140 union board, 93 private-aided, 175 private non-aided, 73 railway and 10 subsidised institutions. Of the total 726 were in rural and 540 in urban areas. In addition, 267 dispensaries worked under the Public Health Department. Beds totalled 6,000 including 3,515 in state-public, local fund and private aided hospitals and 2,485 in state-special, railway and private non-aided institutions.

Altogether 9,012,418 patients were treated in addition to 582,508 who attended the medical centres under the Public Health Department. The most important causes of sickness were malaria, 3,035,346 cases ; skin diseases 1,068,359 ; digestive system, *viz.* stomach 239,245, intestines 218,240, and others 703,880. Other diseases treated included respiratory 513,737 excluding tuberculosis of lungs 13,916 and pneumonia 25,961 ; eyes 331,946 ; ear 306,855 ; ulcerative inflammation 295,117 ; dysentery 202,208 ; influenza 160,504 ; areolar tissue 105,694 ; pyrexia of uncertain origin 98,057 ; nerves, spinal cord, brain and meningitis 88,407; kala-azar 73,891 ; gonorrhoea 33,065 ; syphilis 21,456 ; enteric fever 11,102 ; beri-beri 7,182 ; leprosy 5,015 ; and relapsing fever 1,930. Opium poisoning cases numbered 111 of which 14 were fatal and other poisoning cases 2,346. Of 3,461 cases of normal labour 26 died and of 1,216 abnormal cases 98 died. The tuberculosis hospital at Jadabpur under the auspices of the Calcutta Medical Aid and Research Society was maintained partly by public donations and partly by the Calcutta Corporation and the local Government.

Surgical cases numbered 150,297 with 416 deaths. In state-public, local fund and private aided institutions 117,589 operations were performed.

The major portion of the expenditure on the upkeep and maintenance of medical institutions came from local bodies, *i.e.*, Rs. 16,91,129, whilst Government provided Rs. 3,10,282. Of a total expenditure of Rs. 25,75,946, salaries of medical officers consumed Rs. 7,44,775, nursing Rs. 68,782 and diet Rs. 1,51,860.

Central Provinces and Berar.

143. The number of hospitals and dispensaries increased by 7 (6 in rural areas and one in urban). Of the 161 rural dispensaries only 2 were wholly and 7 partly maintained by Government, 103 by local bodies, 37 by private agencies and 12 by other bodies. The scheme of subsidising medical practitioners to settle in villages, not having proved successful, was abandoned.

Medical personnel consisted of eight I. M. S. officers and 1,081 other officers, the distribution being 1 and 117 respectively in provincial headquarter institutions, 6 and 642 respectively in district headquarters and other urban hospitals and dispensaries and 1 and 322 respectively in rural areas.

The C. P. Medical Registration Act, 1916, has not yet been enforced owing to financial stringency. Twenty-eight women qualified as midwives by passing the prescribed test of the C. P. Medical Examination Board. The principal diseases were :—digestive system 501,677 cases ; malaria 390,042, ulcerative inflammation 280,949, other skin diseases 259,495, eye diseases 245,348 including trachoma 28,081, cataract 2,358, glaucoma 811 and others 214,098, ear disease 206,092, scabies 183,335, pyrexia of uncertain origin 134,388, diseases of nervous system 103,751, influenza 80,670, diarrhoea 76,366, dysentery 61,242 (amoebic 36,311 and bacillary 24,931), syphilis 15,373, gonorrhoea 11,712, other " V. D." 3,811, tubercle of lungs 3,482, other tubercular diseases 2,472, leprosy 1,912, mental disease 1,162, stone in the bladder 360, c.s. fever 231, osteomalacia 283, goitre 108 and typhus 35 (tick 2 and unknown vector 33). Opium poisoning cases totalled 275 with 13 deaths ; other poisoning cases 10,509 with 24 deaths. Normal maternity cases numbered 4,883 of which 7 proved fatal ; abnormal cases were 1,815 with 165 deaths.

Selected operations totalled 17,934.

Antirabic treatment was provided at Nagpur, Jubbulpur, Raipur, Hoshangabad, Akola and Saugor and 1,825 cases were treated. In accordance

with the resolution passed by the 12th Conference of Medical Research Workers held at Calcutta from 26th November to 1st December, the question of opening an anti-rabic treatment centre in each district was under consideration.

Bombay Presidency.

144. The Government hospital organisation in urban areas continued to maintain a high standard of medical treatment; rural areas are still backward in this respect.

In addition to thirteen I. M. S. and 2 R.A.M.C. officers, a cadre of 18 provincial medical service officers (class II) and 249 subordinate medical service officers is maintained for the administration of 267 dispensaries, the district boards paying a fixed contribution of about 66% of the cost. In the case of remaining 111 dispensaries, the local bodies recruit their own staffs. In rural areas village aid posts have been set up, trained compounders, school masters or educated villagers being provided with a limited supply of drugs and dressings for simple treatment and first-aid. This system is employed in several districts but is not considered by the Surgeon General as even a reasonable substitute for a qualified medical man.

Non-official bodies, concerned chiefly with infant welfare, baby weeks, leprosy, blindness, tuberculosis, social hygiene, etc. and the Red Cross Society, are doing good work in the field of medical relief.

The principal causes of sickness were malaria, 693,587 cases; diseases of digestive system 643,810 (stomach 117,142 and intestine 161,564); respiratory diseases 315,072 including tubercle of lungs 16,059 and pneumonia 22,503; skin diseases 244,942; eye diseases 242,298; ear 182,035; round worms 120,599; influenza 86,051; dysentery 60,908; diseases of nerves, spinal cord, brain and meninges 60,368; pyrexia of uncertain origin 55,136; syphilis 28,247 and gonorrhoea 22,157. Opium poisoning cases totalled 516 and other poisonings 8,288.

Normal maternity cases numbered 26,474 and abnormal cases 3,263; of these 44 and 111 respectively proved fatal.

Surgical operations included 1,548 for removal of tumours and cysts; 771 amputations; 9,989 on the eye including cataract 3,141 and trachoma 393; 1,777 on the bladder; 1,767 on the abdominal wall and cavity; and 2,521 obstetrical.

Anti-rabic treatment centres were at work at 13 places including the Haffkine Institute at Parel. The price per treatment was reduced from Rs. 10 to Rs. 5.

Madras Presidency.

145. Twenty-five new dispensaries were opened in rural and 2 in urban areas and 7 rural institutions were closed or transferred to other departments or classes. Since the issue in 1932 of Government orders, holding in abeyance the appointment of medical practitioners to subsidised rural dispensaries which had been sanctioned but not opened, no budget provision has been made for the payment of subsidies to new rural dispensaries. The "Visited Dispensary system" under which a dispensary medical officer or practitioner visits neighbouring villages on two specified days a week continued in operation in Anantapur, South Arcot, Guntur, Malabar, Nilgiris, Tinnevelly and Vizagapatam Agency but was discontinued in places where the attendance of patients was persistently below 20.

Medical personnel comprised thirty-one I. M. S. and I. M. D. officers, 2 W. M. S., 309 salaried graduates, 1,303 licentiates, 148 honorary graduates, and 99 licentiates, 337 European and Anglo-Indian nurses, 775 midwives, 16 *dais* and 1,110 compounders.

The year 1934 was notable in the history of Indian medical education. An examination of the Royal College of Surgeons of England for the Primary Fellowship was held for the first time in India in December 1934 at Madras. Of 60 candidates appearing for the examination, 21 were successful, of whom 13 were from the Madras Presidency.

In this province financial stringency has had its adverse effects and although 119 institutions were provincialised during the three years, 1928-30, further progress in this direction has stopped.

The Surgeon General summarises some notable recent advances in the medical administration of the province in the following quotation taken from his triennial report, 1932-34.

"The proposal of the Surgeon General and the D. P. H. to constitute a Public Health Committee in place of the Board of Health for a better co-ordination of Public Health work in the Presidency has been approved by the Government. The Government have also approved the Surgeon General's proposal to hold Annual Medical Conferences in the District headquarters at the beginning of every year consisting of Presidents of District Boards, Chairmen of Municipal Councils and District Medical Officers to discuss and to solve intricate medical problems connected with the working of medical institutions under the control of local bodies. The Surgeon General's proposal to constitute a Central Research Board for the Province for the purpose of advising in the matter of research on diseases which are met with chiefly in *muffassal* practice was approved by Government."

Diseases of skin headed the list with 2,136,907 cases followed by diseases of the eye 1,763,339, other diseases of the digestive system 1,706,317, ulcerative inflammation 1,383,732, diseases of respiratory system 1,140,759, malaria 1,094,553, diseases of ear 1,079,049, diseases of intestines 931,091, pyrexia of uncertain origin 621,839, diseases of stomach 464,437, diseases of areolar tissue 431,780, nerves, spinal cord and meningitis 351,438, rheumatic fever 331,951, diseases of organs of locomotion 322,921, dysentery 301,777, roundworms 269,849, influenza 267,140, ankylostomiasis 166,438, liver disease 142,487, gonorrhoea 112,735, syphilis 111,481, leprosy 71,184, tubercle of lungs 46,454 and beri-beri 23,091. Opium and other poisoning cases numbered 1,823 and 31,601, respectively. Among the 98,540 labour cases dealt with 758 deaths occurred.

There were 408 leprosy clinics at work in Government hospitals and dispensaries and 16 leprosy relief councils have been formed in the districts. The venereal department of the Government General Hospital, Madras, is the largest of its kind in South India, but facilities for treatment of venereal cases were provided in all hospitals and dispensaries.

Coorg.

146. Malaria continued to be the chief cause of attendance at hospitals and dispensaries, and a total of 99,922 cases was recorded; next in order were respiratory diseases 33,077 cases, other diseases of digestive system 28,197, scabies 18,077, diseases of blood and spleen 14,756, pyrexia of uncertain origin 10,771, diseases of nervous system 8,696, skin diseases 6,726, ulcerative inflammation 6,275, dysentery 5,464 (bacillary 1,903 and amoebic 3,561), intestinal disease 4,825, stomach 3,162, diarrhoea 4,711 and rheumatic fever 4,018.

Assam.

147. I. M. S. officers numbered 12, I. M. D. 4, assistant surgeons 43, sub-assistant surgeons 283, honorary assistant surgeons 4, and sub-assistant surgeons 3, European and Anglo-Indian nurses 11 and Indian nurses 13.

The two most important projects awaiting allotment of funds were two separate hospitals for males and females in connection with the Sylhet Medical School, and a leper hospital at Jorhat, estimated to cost Rs. 4,58,374 and Rs. 1,84,394, respectively. The scheme of providing Shillong with a separate hospital for men estimated to cost Rs. 3,69,051 was still under consideration of the local Government; that for females was nearing completion. The construction of a maternity and gynaecological block at Dibrugarh at an estimated cost of Rs. 23,500 is to be commenced. Only the *sadr* hospital, Sylhet, was provincialised. The question of providing a hospital on the sanatorium principle was under consideration.

Only 2 new dispensaries, including one subsidised, were opened in rural areas, the largest number at work in any one district being 61 in Sylhet and the lowest one each in Manipur state and Balipara. Table IX (xiv) gives the number of dispensaries per 100,000 persons and per 1,000 square miles.

TABLE IX (xiv).

Name.	Per 100,000 inhabitants.	Per 1,000 square miles.
Whole province	**2·3**	**3·2**
Cachar	2·6	4·2
Sylhet	2·4	11·1
Khasi and Jaintia Hills	7·2	1·3
Naga Hills	4·4	2·5
Lushai Hills	8·8	1·6
Goalpara	2·6	5·8
Kamrup	1·8	4·6
Darrang	2·2	4·4
Nowgong	2·3	3·3
Sibsagar	1·8	3·3
Lakhimpur	1·6	2·9
Garo Hills	3·1	1·9
Manipur	0·2	0·1
Sadiya Frontier Tract	18·7	25·7
Balipara Frontier Tract	19·4	1·9

Attendances at hospitals and dispensaries totalled malaria 617,763, diseases of skin 355,047, respiratory diseases 171,697, digestive diseases 146,283 (excluding diseases of stomach 74,654 and intestinal disease 68,706), eye affections 126,348, and other diseases due to metazoan parasites 124,009. Ulcerative inflammation was the cause of 95,892 attendances, diseases of bones, joints, muscles, etc., of 82,841, ear of 53,699, pyrexia of uncertain origin 47,845, dysentery 41,660, goitre 37,605, influenza 34,760, diseases of nervous system 26,598, blood and spleen 10,692, kala-azar 5,558 and tubercle of lungs 1,573. Dysentery was very prevalent in all districts particularly in Sylhet, Goalpara, Kamrup and Nowgong and malaria in Sylhet, Goalpara, Kamrup and Nowgong. Of the 10 smallpox cases only 4 were found to be vaccinated.

Selected operations numbered 1,525 and included excision of tumours 54, excision of joints 5, operations on bone 65, amputations 27, extraction of lens 434, abdominal section 123, removal of calculi 71 and obstetric cases 133.

Burma.

148. Compared with 1933, there was a net decrease of 3 institutions due mainly to financial stringency. The I. G. C. H. remarks in this connection—

"But if the times were unpropitious for increasing the number of medical institutions, the relatively low cost of construction, associated with trade depression, encouraged many local bodies with funds at their disposal, to seize the opportunity of rebuilding, reconditioning and extending existing hospitals."

Funds have been provided for erecting 8 new hospitals at Yenangyaung (40 beds), Gyobingauk (14 beds), Maymyo (female ward, 12 beds), Kyaiklat (36 beds), and at 4 other places. New local fund hospitals of modern design have been built at Prome (60 beds), Taungdwingyi (28), Ye (10), Kayau (10) and Pantanaw. A new administrative and outpatient department at the general hospital, Mandalay, and at the civil hospitals at Mergui, Moulmeingyun and Pakokku have been constructed.

The sanctioned cadre of I. M. S. officers totalled 38 though only 26 were employed; I. M. D. officers numbered 11 of which 7 were employed in the Medical Department, 3 in the Public Health Department and one in the Bacteriological Department. One private medical practitioner was confirmed as a civil surgeon. Other staff were civil assistant surgeons 80, sub-assistant surgeons 340 excluding 32 in the jail department, subsidised medical practitioners 4, honorary graduates 18 and licentiates 10, lady doctors 13, nurses 369, male nurses 106, midwives 188 and compounders 307.

Of 3,363,825 patients attending hospitals and dispensaries, malaria accounted for 406,424 cases, other diseases of digestive system 350,820, skin diseases 289,954, respiratory diseases 288,496, ulcerative inflammation 239,043, diseases of intestines 225,761, roundworms 209,066, diseases of eyes 175,941, of ear 134,738, of stomach 110,463, pyrexia of uncertain origin 77,685, influenza 33,163, dysentery 30,290, syphilis 29,942, and gonorrhoea 21,741, tubercle of lungs 6,389, other tubercular disease 1,424, diabetes 884 and beriberi 1,481. Altogether 4,848 cases of leprosy attended clinics in civil hospitals in the districts of Minbu, Meiktila and Insein and 136 at the Rangoon General hospital. Prior to retrenchment the treatment of venereal disease was available at 27 hospitals with the aid of a special grant from Government but since the cessation of the grant in 1932, such treatment has been discontinued except in a few Government hospitals.

Normal labour cases numbered 11,825 with 180 deaths and abnormal 1,886 and 180, respectively. Twelve deaths occurred among 209 opium poisoning and 27 among 801 other poisoning cases.

Most of the major surgery is conducted in the Rangoon General hospital and at the civil hospitals at Mandalay, Akyab, Bassein, Toungoo, Moulmein and Maymyo, whilst the main centre for obstetric operations is the Dufferin hospital, Rangoon.

An important feature of the surgical work was the large volume of intravenous injections which are mainly carried out in connection with the treatment of syphilis and these were mainly responsible for the high figure of 37,700 under the head of "other operations on veins". The number of operations on the eye and bladder was relatively small due mainly to the rarity of cataract and urinary calculus. Of a total of 115,034 persons operated on, 108,866 or 95 % were cured.

In the Pathological Department of Rangoon General Hospital, the mercuric chloride method of estimating blood urea was introduced and after a prolonged research the Ascheim Zondek test for pregnancy was replaced by the Friedmann method which in 71 consecutive cases proved its absolute reliability.

Most hospitals, even the smallest, are now equipped with a microscope and the equipment necessary for carrying out simple laboratory tests. In the larger hospitals laboratory examinations numbered 6,055 in Akyab, 9,030 in Mandalay, 3,086 in Moulmein, 20,018 in Myitkyina, 1,489 in Bassein and 1,234 in Toungoo. It has been arranged that 6 sub-assistant surgeons should be trained in laboratory methods annually for 6 months at the Rangoon Pasteur Institute with a view to holding charge of district laboratories and of venereal, leprosy and anti-rabic clinics.

B.—Indian States.

149. *Mysore State.*—The number of hospitals and dispensaries remained unchanged. Altogether 45,695 in-patients and 4,355,680 out-patients were treated; of these 43,010 and 4,104,689, respectively, attended state-public, local fund and private-aided institutions. A total of 12,808 in and 408,599 out-patients were treated in 26 institutions of classes I, III and IV reserved for women and containing 431 beds. Beds numbered 2,130 which included 1,930 (886 for males and 1,044 for females) in state-public, local fund and private-aided hospitals and dispensaries, the female institutions providing 431 beds.

The principal causes of sickness were malaria 704,405 cases, diseases of digestive system 457,475, diseases of eye 342,954, pyrexia of uncertain origin 191,045, diseases of ear 163,755, diarrhoea 101,296, dysentery 80,991, ankylostomiasis 13,944, syphilis 13,184, gonococcal infection 11,192, enteric fever 4,173, tubercle of lungs 2,815, other tubercular disease 2,653, and leprosy 301. Surgical operations totalled 100,798. The *Unani* and *Ayurvedic* dispensaries treated 1,176,919 cases.

The 282 midwives attended 22,823 maternity cases or 80 cases each, whilst the maternity hospitals at Bangalore, Mysore and Kolar Gold Fields attended 5,770 cases. Birth control clinics were continued at these institutions.

The Princess Krishnajammanni Tuberculosis Sanatorium, Mysore, dealt with 337 cases; of these 223 were relieved and 37 died. The epidemic diseases hospitals at Bangalore, Kolar Gold Fields and Mysore continued to function. Patients treated in the leper asylum, Bangalore, numbered 191. Leprosy survey work was continued in 3 *taluks*.

Expenditure on the upkeep of hospitals and dispensaries of classes I, III and IV aggregated Rs. 15,09,558 and included Rs. 9,46,963 on salaries, Rs. 1,78,782 on medicines and Rs. 1,53,985 on patients' diet.

II.—Mental Hospitals.

150. According to the census of 1931, the number of insane persons in British India was 98,449 (males 60,424 and females 38,025) while less than one-seventh of this total or 13,506 such persons (males 10,449 and females 3,057) were housed in 19 mental hospitals in the provinces during 1934 having accommodation for 9,518 patients. There was therefore overcrowding to the extent of nearly 4,000 cases or 42%. Table IX (*xv*) shows that the maximum number confined in these institutions was in excess of the available

accommodation in all provinces and especially in Bombay, Madras and Burma. The apparent disparity between the incidence of insanity among males and females is stated to be attributable partly to the natural tendency to conceal female cases and partly to the fact that women, leading a more sheltered life, are less subject to anxiety and less liable than men to indulge in excesses of various kinds.

TABLE IX (*xv*).

	Number.	Accommodation.			Maximum confined.			Sq. ft. per head.
		M.	F.	Total.	M.	F.	Total.	
British India .	19	**7,261**	**2,257**	**9,518**	**8,380**	**2,508**	**10,888**	—
Punjab . .	1	826	182	1,008	882	245	1,127	70
U. P. . .	3	1,208	406	1,614	1,292	378	1,670	50
B. & O. . .	2	1,120	372	1,492	1,158	352	1,510	50
C. P. . .	1	344	126	470	380	99	479	54
Bombay . .	6	1,273	628	1,901	1,528	671	2,199	50—140
Madras . .	3	900	254	1,154	1,349	444	1,793	50
Assam .	1	566	124	690	581	123	704	50
Burma . .	2	1,024	165	1,189	1,210	196	1,406	36—87

In addition to the institutions in Table IX (*xv*) the mental observation ward, Bhowanipur (Calcutta), provides 30 beds, (6 for Europeans and 24 for Indians) and the mental ward of the Albert Victor Hospital, Gobra (Calcutta), for the treatment of leprosy has 10 beds (males 8 and females 2). So far as information is available, among Indian States mental hospitals exist in Indore, Bangalore, Baroda and Chimbel. In the Hyderabad State an asylum for treating mental cases forms part of the central jail at Hyderabad. European patients from the U. P., B. & O., C. P., Bengal and Assam are sent to the European Mental Hospital at Ranchi and the Indian Mental Hospital there treats Indian patients from Bengal and B. & O. European cases in the Bombay Presidency are treated in a section of the Central Mental Hospital, Yeravda, which provides 222 beds—137 for males and 85 for females; those in the Madras Presidency are housed in the Madras Mental Hospital with an accommodation of 155 beds (males 85 and females 70).

151. Table IX (*xvi*) gives the admissions, total population, daily average strength, daily average sick, cures and deaths among mental cases.

TABLE IX (*xvi*).

	Admitted.	Population.			Cured.	Died.	Average Strength.	Average sick.	Criminal lunatics.
		M.	F.	Total.					
British India .	3,151	**10,449**	**3,057**	**13,506**	**1,621**	**668**	**10,457**	**814**	**1,381**
Punjab . .	391	1,161	298	1,459	128	68	1,097	79	265
U. P. . .	469	1,610	443	2,053	449	158	1,550	134	77
B. & O. .	198	1,272	412	1,684	84	45	1,487	69	5
C. P. . .	95	442	118	560	53	31	469	17	141
Bombay . .	865	2,047	852	2,899	380	159	2,108	112	176
Madras . .	655	1,771	558	2,329	220	114	1,727	301	268
Assam . .	164	697	144	841	121	23	687	60	291
Burma . .	314	1,449	232	1,681	186	70	1,332	42	658

152. The principal types of insanity treated in provinces are given in Table IX (*xvii*) which is arranged according to the revised nomenclature.

TABLE IX (*xvii*).

	Punjab.	U. P.	B. & O.	C. P.	Bombay.
Total	**1,459**	**2,053**	**1,684**	**560**	**2,899**
Mental Deficiency	116	187	81	52	199
Manic Depressive Insanity	223	6	154	44	121
Mania	226	501	177	147	684
Melancholia	95	258	163	84	694
Schizophrenia including Dementia Praecox.	222	97	342	63	369
Secondary Dementia	220	24	134	10	175
Paranoia and Paranoid States	24	99	166	20	122
Epilepsy and Epileptic Insanity	125	134	69	41	94
Toxic Psychosis—					
(*a*) Acute confusional Insanity	40	169	51	16	59
(*b*) Alcoholic Psychosis	8	23	33	3	31
(*c*) Cannabis Indica Psychosis	67	318	117	5	130
(*d*) Of Endocrine Origin	...	...	...	5	...
(*e*) In relation to child bearing	8	62	1	15	33
(*f*) In relation to other constitutional diseases	9	40	3	2	49
Organic Psychosis—					
(*a*) General	...	2	7	...	4
(*b*) Cerebral Syphilis	1	71	3	2	2
(*c*) Arteriopathic and Senile Psychosis	24	16	17	32	26
(*d*) Encephalitis	7	...	1	...	...
(*e*) Other cerebral Lesions	4	...	4	...	20
Neurosis and Psycho-Neurosis	...	19	31	...	2
No appreciable disease	40	...	124	18	...
Not yet diagnosed	...	27	6	1	85

	Madras.	Assam.	Burma.	Total.
Total	**2,317**	**341**	**1,681**	**13,494**
Mental Deficiency	205	8	91	939
Manic Depressive Insanity	101	113	17	779
Mania	353	238	464	2,790
Melancholia	113	163	297	1,867
Schizophrenia including Dementia Praecox	677	163	302	2,235
Secondary Dementia	140	6	58	767
Paranoia and Paranoid States	105	15	40	591
Epilepsy and Epileptic Insanity	132	43	38	676
Toxic Psychosis—				
(*a*) Acute confusional Insanity	41	1	81	458
(*b*) Alcoholic Psychosis	76	...	23	197
(*c*) Cannabis Indica Psychosis	149	87	28	901
(*d*) Of Endocrine Origin	...	...	...	5
(*e*) In relation to child bearing	20	1	6	146
(*f*) In relation to other constitutional diseases	40	...	1	144
Organic Psychosis—				
(*a*) General	22	...	131	166
(*b*) Cerebral Syphilis	24	3	1	107
(*c*) Arteriopathic and Senile Psychosis	64	...	37	216
(*d*) Encephalitis	1	...	6	15
(*e*) Other cerebral Lesions	4	...	4	36
Neurosis and Psycho-Neurosis	...	...	...	52
No appreciable disease	39	...	56	277
Not yet diagnosed	11	...	...	130

Details of the causes of insanity are given in Table IX (*xviii*). In many cases the causes of insanity were more than one.

TABLE IX (*xviii*).

	Punjab.	U. P.	B. & O.	C. P.	Bombay.	Madras.	Assam.	Burma.	Total.
Total	**424**	**469**	**343**	**196**	**966**	**1,292**	**179**	**334**	**4,203**
Mental Stress—									
Moral	1	...	...	...	29	28	...	...	58
Business worry	3	21	...	39	11	60	...	36	170
Domestic worry	28	49	80	3	117	180	14	1	472
Stress of military service	...	...	...	...	...	...	...	...	...
Toxins—									
Cannabis Indica	42	113	19	12	49	74	42	15	366
Alcohol	5	12	20	3	27	23	...	7	97
Other Toxins	...	5	2	2	44	20	...	39	112
Physical	...	4	...	...	161	76	...	78	319
Opium	1	1	...	...	3	5	...	...	10
Bodily illness	6	3	1	3	100	82	...	...	195
Pregnancy	...	...	3	...	6	...	2	...	11
Child-birth	4	3	1	11	23	25	...	...	67
Climacteric	...	9	2	3	9	23	...	...	46
Epilepsy	27	6	8	8	28	53	14	4	148
Head injury	1	4	4	...	2	5	...	2	15
Infection—									
Encephalitis Lethargica	...	...	...	...	...	...	...	...	...
Influenza	...	...	...	...	...	...	...	...	...
Syphilis	...	16	11	...	4	40	...	77	148
Other infections	8	22	6	...	6	9	2	11	64
Old age	...	9	8	5	14	19	...	...	55
Hereditary predisposition	24	19	20	46	160	191	6	14	480
Previous attacks	71	24	48	25	87	195	...	32	392
Unascertained	203	149	113	36	86	274	90	18	978

153. Insanity is an affliction of the adult period and Tables IX (*xix*) and IX (*xx*) give details of the 3,118 admissions by age-groups and religions. Of the total, 74% were between 20 and 40 years of age; nearly 60% were Hindus and 21% Muhammedans. The high incidence among females in these ages was evidently due to the strain of child-bearing; that among males corresponds to the period of entry into family life and the associated cares and worries.

TABLE IX (*xix*).

	Under 20 years.		20—40 years.		40—60 years.		Over 60 years.		Total.	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
British India .	**154**	**61**	**1,764**	**458**	**455**	**172**	**36**	**18**	**2,409**	**709**
Punjab . .	23	10	234	51	55	16	2	...	314	77
U. P. . .	19	6	289	60	63	22	6	4	377	92
B. & O. . .	12	9	92	47	16	18	2	2	122	76
C. P. . .	4	2	56	14	15	4	...	...	75	20
Bombay . .	49	17	477	131	104	62	17	8	647	218
Madras . .	36	12	322	102	126	38	4	3	488	155
Assam . .	3	...	93	23	16	7	1	...	113	30
Burma . .	8	5	201	30	60	5	4	1	273	41

TABLE IX (*xx*).

	Hindus.		Muhammedans.		Christians and Europeans.		Others.		Total.	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
British India .	**1,475**	**396**	**555**	**97**	**165**	**144**	**214**	**72**	**2,409**	**709**
Punjab . .	147	43	151	26	5	4	11	4	314	77
U. P. . .	284	63	77	12	16	16	...	1	377	92
B. & O. . .	63	21	24	6	35*	45*	...	4	122	76
C. P. . .	66	18	6	1	3	1	...	...	75	20
Bombay . .	395	131	170	22	61	27	21	38	647	218
Madras . .	365	91	88	21	32	40	3	3	488	155
Assam . .	95	22	11	4	1	3	6	1	113	30
Burma . .	60	7	28	5	12	8	173	21	273	41

154. In the *Bombay Presidency*, the death rate was 7·5 p. m. and the chief causes of death were dysentery 17, malaria 17, nervous diseases 13, pneumonia 9, tuberculosis 12 and diarrhœa 5. The Naupada Mental Hospital (Thana) again reported the highest death rate of 16 p. m. and the European ward of the central mental hospital the lowest rate of 1 p. m. In the *C. P.* deaths totalled 31; of these 10 occurred within one year of the patient's stay in the hospital and included 8 patients who had been received in hospital in a bad state of health and were aged 60-80 years. Colitis was the cause of 9 deaths; acute mania 3; pneumonia, influenza, epilepsy, heatstroke and syncope of 2 deaths each; and pulmonary tuberculosis, other tubercular infection, bacillary dysentery, chronic enteritis, cerebral haemorrhage, anaemia, dropsy, sarcoma and septicaemia of one death each. Nearly 10% of new admissions were found infected with hook-worm. In *Assam*, of the 191 admissions to infirmaries 34 were for malaria, 29 for dysentery, 21 for diseases of the digestive system, 12 for influenza, 6 for tuberculosis and 89 for other causes. Over 37% of inmates were admitted in good, 36% in bad and 27% in indifferent health. The chief causes of death were tuberculosis 6 and dysentery 5.

*Include 33 male and 39 female European insanes received from all provinces and treated at the European Mental Hospital at Ranchi.

In *Madras Presidency* the deaths totalled 114 and the death rate was 7 p. m. Tubercular disease was the cause of death in 37 cases, anaemia and debility in 11, syphilis in 6, urinary diseases in 4, diseases of the circulatory system in 21, dysentery in 2, diseases of the nervous and respiratory systems in 4 each and other causes 25. In the *Punjab* the death rate was the lowest on record; of the 68 deaths, 11 were due to pneumonia and tuberculosis each, 4 each to pleurisy, dysentery and debility, 3 to diarrhoea, 7 to ankylostomiasis, 1 to *status epilepticus* and 23 to other causes. In the *U. P.* deaths numbered 158, the death rate, 10·2 p. m. exceeding the rate for 1933 by 3 p. m. Agra and Bareilly mental hospitals recorded 98 and 50 deaths, respectively. In the *Ranchi Indian Mental Hospital, Kanke*, tuberculosis of lungs, ankylostomiasis, gangrene of lungs and general debility and senility were responsible for most of the deaths. No outbreak of epidemic disease was reported. Out of a total of 31 deaths 14 were of patients aged 40-60 years. In the European Mental Hospital, Ranchi, 14 deaths occurred. In *Burma* 68 deaths occurred at the Tadagale Mental Hospital and 4 at Minbu. Most of the deaths were due to general paralysis (30) and tuberculosis of the lungs (17).

155. The latest methods of treatment and skilled nursing are provided at the European Mental Hospital, Ranchi.

The Ranchi Mental Hospital for Indians is the first institution in India to give sulphur injections in the treatment of mental disorders since 1930. Of a total of 285 cases treated with these injections during these 5 years, 18% recovered, 42% improved and in 40% the disease remained stationery. Other methods of treatment included Rorschach test, hypo-analysis, utility of intravenous iodine injections in P. U. O.; use of raw brain in stuporous cases and physio-therapy. In other hospitals also treatment was continued on more or less similar lines.

156. Table IX (*xxi*) gives provincial expenditures on the maintenance and upkeep of mental institutions.

TABLE IX (*xxi*).

	Total.	Diet.	Bedding and clothing.	Medicines.
	Rs.	Rs.	Rs.	Rs.
British India	**34,77,370**	**8,54,237**	**1,17,826**	**16,865**
Punjab	4,37,281	91,923	22,437	1,533
U. P.	2,30,871	65,096	11,730	945
Bihar and Orissa—				
European	4,94,623	1,49,814	23,766	1,789
Indian	3,79,823	60,886	9,373	3,914
C. P.	1,05,655	32,160	5,077	47
Bombay	7,04,583	1,77,106	30,278	1,601
Madras	5,03,474	1,80,400	7,693	1,441
Assam	1,18,571	40,564	6,671	157
Burma	5,02,489	56,288	801	5,438

III.—Medical Colleges.

Punjab.

157. *King Edward Medical College, Lahore.*—The total number of students on the rolls was 487. Eleven students received scholarships from the Punjab Government, 3 from the North-West Frontier Province Government and 41 from non-Government sources.

University Examination Results.

		Appeared.	Passed.
M. B., B. S.:—			
1st	May, 1934	100	50
	October, 1934	58	32
2nd	May, 1934	87	53
	October, 1934	38	20
3rd	April, 1934	59	50
	October, 1934	15	11
Final	April, 1934	34	17
	October, 1934	93	34
Post-graduates (assistant surgeons)		7	7

Delhi.

158. *Lady Hardinge Medical College for Women, New Delhi.*—The session began with 152 resident students.

University Examination Results.

		Appeared.	Passed.
Intermediate Science		23	19
M. B., B. S.:—			
1st		29	13
2nd		20	11
3rd		16	16
Final	Part A.	12	10
	Part B.	14	11

United Provinces.

159. *King George's Medical College, Lucknow.*—268 students were on the rolls.

University Examination Results.

			Appeared.	Passed.
M.B., B. S.:—				
1st	April, 1934		46	34
	October, 1934		12	8
Final Part I	Group A.	April, 1934	43	32
		October, 1934	20	18
	Group B.	April, 1934	38	29
		October, 1934	17	10
Final Part II		April, 1934	39	22
		October, 1934	35	23
M. D.		April, 1934	5	4
M. S.		,, ,,	2	2

Bihar and Orissa.

160. *Prince of Wales Medical College, Patna.*—The number of students on the rolls was 266.

University Examination Results.

		Appeared.	Passed.
M. B., B. S.:—			
2nd	Part I April, 1934	39	16
	Part II April, 1934	41	20
Final	Part I April, 1934	41	23
	Part II April, 1934	44	17
1st	September, 1934	17	14
2nd	Part I September, 1934	24	18
	Part II September, 1934	30	13
Final	Part I September, 1934	25	14
	Part II September, 1934	38	12
1st	January 1935	28	23

Bengal Presidency.

161. (*a*) *Medical College, Calcutta.*—A total of 771 students including 49 military and 18 female students was on the rolls.

University Examination Results.

	Appeared.			Passed.		
	M.	F.	Mily. Students.	M.	F.	Mily. Students.
M. B., B. S.:—						
Preliminary Science	110	3	3	102	2	1
1st	128	4	5	88	4	4
2nd	98	4	..	65	4	..
3rd	86	..	..	78	..	..
Final	237	3	..	93	2	..

Membership Medical Faculty:—

	Appeared.		Passed.	
	Civil.	Military.	Civil.	Military.
Preliminary Science	..	2	..	2
1st	3	2	3	1
2nd	7	..	3	..
3rd	1	..	1	..
Final (new Regulations)	23	..	7	..
Intermediate	..	3	..	3
Final (Part II)	..	14	..	10
Final (Part I)	2	8	1	6
Final (Part I and New Combined)	..	..	..	..

(*b*) *Carmichael Medical College, Belgachia.*—664 students were on the rolls.

University Examination Results.

	Appeared.	Passed.
M. B.:—		
Preliminary Science	141	107
1st	161	88
2nd	134	65
3rd	96	79
Final	199	62
State Medical Faculty :—		
Intermediate Membership	..	..
Final Membership	6	3

No candidate appeared for the preliminary membership examination.

Bombay Presidency.

162. (*a*) *Grant Medical College, Bombay.*—The total number of regular students on the rolls at the end of the year was 690, of whom 98 were women. No military students were under training.

University Examination Results.

		Appeared.	Passed. M.	Passed. F.
M. B., B. S.:—				
1st Examination	April	99	46	3
	December	179	58	9
2nd Examination	April	79	37	9
	December	109	63	9
3rd Examination	Group A—			
	April	94	11	..
	December	135	18	5
	Group B—			
	April	94	26	2
	December	113	10	3
M. D. (Midwifery)		5	1	
M. S.		5	1	
B. Hy. Part II		8	1	
B. Sc.		4	2	

(*b*) *Seth Gordhandas Sunderdas Medical College, Bombay.*—The regular students on the rolls numbered 389. This total included 28 women students and 80 new admissions.

M. B., B. S.:—		
First	1st year	79
	2nd year	60
Second—3rd year		59
Third	4th year	64
	5th year	126
B. Sc.		1
Total number of regular students		389
Post-graduates		10
	Grand Total	399

University Examination Results.

	Appeared.		Passed.	
	April.	Dec.	April.	Dec.
M. B., B. S. :—				
1st	48	93	19	39
2nd	55	62	28	42
3rd	75	81	23	22

Five candidates appeared for the M. D. degree and 1 passed. Four appeared for the M. S. degree and 1 passed.

Madras Presidency.

163. (*a*) *Medical College, Madras.*—890 students were on the rolls.

	M.	F.	Total.
M. B., B. S.	599	87	686
L. M. S.	3	1	4
Military medical students	74	..	74
L. M. Ps. qualifying for M. B., B. S. degree	19	1	20
Public Health Diploma	3	..	3
Chemists and Druggists	10	..	10
Sanitary inspectors	90	..	90
Post Graduate Biochemistry	1	..	1
Post Graduate Anatomy	1	..	1
Post Graduate Pathology and Bacteriology	1	..	1
Total	801	89	890

University Examination Results.

	Appeared.	Passed.
M. B., B. S. :—		
1st (New Regulations Part II)	205	109
2nd Part II	147	81
Final Part II	226	87

Of the military medical students 11 were in the final year ; 2 appeared for the final M. B., B. S. examination in December, 1934, of whom one passed. Three (including 1 who failed in M. B., B. S.) appeared for the Board examination in December, 1934, and passed. One appeared for the final M. B., B. S. examination in April, 1935, but failed, while 5 appeared for the Board examination in April, 1935, and two passed. One candidate was on leave on account of illness.

(*b*) *Medical College, Vizagapatam.*—246 students were on the rolls at the beginning of the academical year, 50 being new admissions. This number however at the end of the year was reduced to 230, the variation being due to the results of the University examinations and to the withdrawal of passed candidates.

This college is affiliated to the Andhra University. Until December, 1933, all examinations were held conjointly with the Madras University. In March and December, 1934, all examinations except the final were held in Vizagapatam. In March, 1935, the final M. B., B. S. was held in Vizagapatam except clinical and practical midwifery and gynaecology which was held in Madras.

University Examination Results.

		Appeared.	Passed.
Pre-registration		102	43
M. B., B. S.:—			
First	Part I	49	43
	Part II	68	32
Second	Part I	22	19
	Part II	39	30
Final	Part I	27	26
	Part II	58	17

Medical Research.

164. The following brief paragraphs indicate the activities of various college departments in the field of medical research.

Medical College, Lahore.—Various investigations were carried on, such as (*a*) observations on avertin narcosis ; (*b*) investigations on the value of Co_2 gas in anæsthesia, (*c*) treatment of oriental sore ; (*d*) the vitamin A contents of *ghee* ; (*e*) pharmaceutical action of certain derivatives of *Cotarnine ;* (*f*) observations on the metabolism of *Carotene ;* (*g*) observations on the treatment of tetanus ; (*h*) carcinoma of the gall bladder ; (*i*) observations on cirrhosis of the liver as seen in the Punjab ; (*j*) therapeutic value of camphor as cardiac and general circulatory stimulant, biological assay of adrenaline, rôle of alcohol in modern therapeutics, use and abuse of purgatives in medical practice and incompatabilities in prescribing.

King George Medical College, Lucknow.—The Department of Anatomy published 7 papers on (1) A Breech-Fused Twin Monster; (2) Variations in the lower end of Femurs from Indians ; (3) Genito—Urinary system of *Sciurus* ; (4) a case of Human Ischiopagus Double Monster ; (5) Arrangement of Superficial veins of Cubital Fossa in Indians ; (6) Volvulus in a newborn child and (7) the course and distribution of the Anterior Ramus of a typical Thoracic nerve in man and certain other mammals. The Physiology Department published 4 papers on (1) a new physiological psychology ; (2) alcohol and anaesthesia ; (3) colour vision and (4) the new doctrine of rhythm. The Department of Pharmacology published a paper on the biological assay of digitalis by the frog method, describing a characteristic curve for Rana Tigrina. The Department of State Medicine prepared a paper on the methods of tuberculosis prevention in foreign countries, which was read at the All-India Tuberculosis Conference convened at New Delhi by the King George's Thanksgiving (Tuberculosis) Fund.

The Department of Pathology published papers on (1) further notes on the aetiology of goitre in the super-endemic areas of the Gonda and Gorakhpur districts. (2) Further clinical notes on endemic goitre, sub-thyroidism, cretinism and deaf mutism in the super-endemic areas of Gonda and Gorakhpore districts ; (3) observations on the gastric form of anaemia ; (4) nephritis , its classification and nature in Indians ; (5) a case of dry pleurisy with extreme eosinophilia ; (6) observation on blood urea, urea clearance test and urea concentration factor among Indians in health and disease ; (7) modern

treatment of pneumococcal pneumonia; (8) a new conception of Bunti's disease; (9) coelic disease and its treatment; (10) anaemia in nephritis; (11) albumen reaction in the sputum of tubercular patients; (12) means to improve the common laboratory diagnosis by stool examination (incomplete) and (13) a case of complete heart block.

Prince of Wales Medical College, Patna.—The University of Patna has awarded two research scholarships one to Dr. S. S. Mahmud Shah for working under Lt.-Col. H. G. Alexander, I.M.S., the Professor of Surgery, on the surgical aspect of filariasis and the other to Dr. Barid Baran Sen for working under Dr. R. K. Pal, the Professor of Physiology, on the metabolism of sugars. The Department of Anatomy continued to record observations on anatomical anomalies and on the reconstruction of the embryos. The Department of Pathology was investigating on the nature of gastric juice in hook-worm diseases and on the possibility of a cutaneous test for the same infection. The Departments of Physiology, Pharmacology and Organic Chemistry published 13 papers.

Medical College, Calcutta.—The Department of Biology is continuing research on fish and plant morphology (classification of fruits in Bengal plants). The Anatomy Department published a paper on some variations in the musculature of the superior extremity. The Pathology Department published 12 papers entitled (1) Streptococcal Septicaemia and Filarial Orchitis; (2) Actinomycosis of the human body; (3) An interesting case of Dermal Leishmanoid; (4) Gonorrhoea, Pathology and Laboratory Diagnosis; (5) Tuberculosis, Pathology and Laboratory Diagnosis; (6) Diphtheria, Pathology and Laboratory diagnosis; (7) A study of 14 cases of Rhinosporidium infection; (8) Cutaneous manifestations of Epidemic Dropsy; (9) Bengal Spleno-megaly; (10) A case of displaced and malformed kidney; (11) Practical morbid, Histology and Bacteriology for medical students and (12) Study of Faecal Cocci. Four papers of this department are under publication, *viz.*, (1) Epidemic Dropsy with special reference to cutaneous manifestations in a boy aged 12. (2) Pathology of Epidemic Dropsy. (3) Nodular Eruptions in Epidemic Dropsy and (4) Dysenteric conditions amongst Europeans in Calcutta. The Department of Medicine also published some papers, *viz.*, (1) Treatment of typhoid in children; (2) Carcinoma of the stomach; (3) the Pathology of Rheumatic Carditis; (4) the modern Widal's Test in Enteric Fevers; (5) the Therapeutic value of an Acridine Dye (Rivanol) 3,047; (6) Cerebrospinal Meningitis; (7) Early diagnosis of Pulmonary Tuberculosis; (8) some observations on difficulties in the diagnosis of malaria; (9) a clinical study of infantilism; (10) Alonkaemic lymphadenosis; (11) Diagnosis of patent Ductus Arteriosus; (12) Congenital Dextrocardia complicated with congenital heart disease; (13) Intestinal Haemorrhage in typhoid fever of infants. Investigations are being carried on (1) the nature of change of gastric acidity on a salt-free diet and its bearing on the treatment of peptic ulcer; (2) the rôle of tuberculo-allergy in assessing the prognosis and in guiding the choice of therapy in pulmonary tuberculosis; (3) a study of the after-results of 70 cases of phrenic evulsion; (4) a study of pulmonary tuberculosis in infants and children is being carried out with the help of the health visitor of the Tuberculosis Association of Bengal; (5) bronchiectasis and (6) abscess and gangrene of the lungs. The Department of Surgery published papers on (1) treatment of compound fractures of bones of the leg by skeletal traction; (2) infective mononeucleosis; (3) prevention and treatment of chronic supperative otitis media. The Department of Ophthalmology published papers on (1) primary glaucoma, a symptom complex of epidemic dropsy; (2) development of ophthalmology

in Bengal; (3) corneal transplantation on opaque corneas; (6) detachment of retina; (7) ocular complications of diabetes; (8) further observations of ocular complications of diabetes; (9) use of diathermy in ophthalmology; (10) xerophthalmia in children and adults with special reference to Bengal; (11) rôle of anaesthesia in ophthalmology.

Seth Gordhandas Sunderdas Medical College, Bombay.—No research work was in progress during the year under report.

Grant Medical College, Bombay.—The Physiology Department carried on investigations regarding the composition of gastric secretion; electro-cardiography; blood changes in lead poisoning and effect of oral administration of insulin phosphoting state. The Anatomy Department worked on the measurement of pelves of Indians; the Pathology Department on the pathogenesis of cancer and Fontanelles in health and disease and the Ophthalmology Department on the eye disease due to improper diet, Epibulbar epithelioma of conjunctiva and treatment of external eye diseases with ultra-violet light. Researches were also carried on in certain skin diseases, *e.g.*, warts, alopecia, areata, psoriasis, ringworm, herpes zoster, impetigo contagiosa and lupus erythematosus and observations were made on tyronorman in the treatment of Grave's Disease. Investigations were also carried out on the treatment of lobar pneumonia, leucorrhœa, chronic infection of the cervix uteri, etiology of acute dysentery in hospital practice in Bombay, routine treatment of bronchial asthma, injection treatment of piles, modern treatment of carbuncles, malaria, hæmoptysis and water test for renal efficiency.

Medical College, Madras.—The Bacteriological Department in collaboration with the Superintendent of the Tuberculosis Hospital carried on investigation as to the evidence of bovine tuberculosis in man and the Biochemistry Department did some research work on kidney efficiency tests. The Dermatology Department continued their observation on anti-leprotic remedies adopting mainly protein shock therapy of a non-specific nature. The midwifery Department carried on investigations on the bacteriology of puerperal sepsis and the rôle of vitamins in the causation and cure of this condition under the auspices of the Indian Research Fund Association and a paper will be published shortly in the "Indian Journal of Medical Research". Seven papers on operative surgery were published during the year. The Ophthalmology Department carried on research on trachoma in co-operation with the King Institute of Preventive Medicine, Guindy. The work will be published shortly in papers. Nine papers of scientific importance were published by Lt.-Col. R. E. Wright, I.M.S., during 1934-35. The Pathology Department continued their work on the transmission of rhinosporidium but no successful result was obtained. The results of investigations of the diseases of the lymph nodes will shortly be published. The Physiology Department is still carrying on its experimental work with acetyl-choline.

The Research Unit published two papers (1) on the chemical examination of tylophora asthmatica and the isolation of the alkaloids, tylophorine and tylophorinine and (2) the anthelmintic constituent of calycopterus floribunda.

IV.—Medical Schools.

165. *General.*—During the current year the Director-General, Indian Medical Service, has undertaken the preparation of a "Note on the Medical Schools of India" dealing with the 28 Government and private medical schools in India and Burma

and with the hospitals attached to them so far as their suitability for medical education was concerned. The note also attempts to lay down certain standards of equipment, etc., at which the medical schools should aim. This note has since been published and the conclusion reached is that none of the medical schools have quite attained the desired standard and that several are deplorably deficient. The two principal defects in most schools are overcrowding in the number of students and deficiency of equipment. It is however hoped that the note will assist medical schools in attempting to reach a better standard more particularly by the provision of somewhat better equipment.

The 28 Medical Schools in existence are distributed as follows :—

Bengal 10 ; Madras 3 ; Bombay 5 ; U. P. 2 ; Punjab 2 ; Bihar and Orissa 2 ; Burma 1; C. P. 1 ; Assam 1 ; and Central India 1.

Punjab.

166. (*a*) *Medical School, Amritsar.*—Of the 416 students on the rolls 19 belonged to the military students class. 116 students appeared for the final L. S. M. F. and 80 passed.

(*b*) *Punjab Medical School for Women, Ludhiana.*—122 students were on the rolls, 85 passed the final L. S. M. F. P. examination.

United Provinces.

167. (*a*) *Medical School, Agra.*—Of the 288 students on the rolls 22 belonged to the military students class.

Examination Results.

	Appeared.	Passed.
Primary	43	28
Intermediate	86	42
Final.—Part I	82	54
Part II	56	38
Parts I and II	19	10

(*b*) *Women's Medical School, Agra.*—84 students were on the rolls.

Examination Results.

	Appeared.	Passed.
Primary	17	14
Intermediate	22	16
Final Part I	26	16
Final	20	14

Bihar and Orissa.

168. (*a*) *Medical School, Darbhanga.*—There were 249 students on the rolls including one female. 72 appeared for the final Board examination and 35 passed ; 74 students of the compounder class appeared for the qualifying examination and 56 passed.

(*b*) *Orissa Medical School, Cuttack.*—There were 201 students on the rolls including 15 females. 70 students including 3 females appeared for the final Board examination and 37 passed including 2 females. 47 candidates appeared for the compounders examination and 31 passed.

Bengal Presidency.

169. (*a*) The following table summarises details of the medical schools in the Presidency :—

State Medical Faculty.

	On rolls.	Primary.		Intermediate.		Final.		Compounder Examination.	
		A.	P.	A.	P.	A.	P.	A.	P.
Campbell School, Calcutta.	578	103	76	103	51	140	78	34	32
Lytton School, Mymensingh.	235	66	35	84	23	53	24	11	8
Ronaldshay School, Burdwan	212	41	26	55	32	73	34	18	11
Chittagong School . .	186	54	35	54	19	37	10	...	...
Jackson School, Jalpaiguri ,	167	20	12	61	36	28	13	...	...
Bankura Sammilani School .	234	58	27	85	31	54	17	...	...
National Medical Institute, Calcutta.	410	89	56	129	58	117	46	...	...
Dacca Medical School. .	511	114	75	151	69	117	52	36	28
Calcutta Medical School. .	449	110	68	158	65	143	59	...	...

A. = Appeared P. = Passed.

(*b*) *School of Tropical Medicine, Calcutta.*—A total of 91 students were on the rolls.

Examination Results.

	Appeared.	Passed.
D. T. M.	41	32
L. T. M.	48	35

Central Provinces.

170. *Robertson Medical School, Nagpur.*—There were 280 students on the rolls. Of the 89 students who appeared for the final Board examination 43 passed.

Central India.

171. *King Edward Medical School, Indore.*—There were 304 students on the rolls.

Examination Results.

	Appeared.	Passed.
1st L. C. P. and S. (Bombay)	1	1
2nd L. C. P. and S. (Bombay)	5	5
Final L. C. P. and S. (Bombay)	5	2
L. M. P. (Nagpur)	112	47
L. M. F. (Calcutta)	28	7
Compounders	163	122

Bombay Presidency.

172. The L. C. P. S. examination results are given below :—

	1st.		2nd.		Final.	
	A.	P.	A.	P.	A.	P.
B. J. Medical School, Poona . .	64	39	106	44	137	53
B. J. Medical School, Ahmedabad .	72	37	78	22	76	23
Medical School, Hyderabad (Sind) .	37	25	41	24	32	11
National Medical College, Bombay .	79	49	88	33	104	34
Christian Medical School, Miraj . .	..	..	27	7	5	..

Madras Presidency.

173. Examination results are given below :—

	On rolls.	1st year.		2nd year.		3rd year.		Final Part I.		Final Part II.	
		A.	P.	A.	P.	A.	P.	A.	P.	A.	P.
Stanley Medical School, Madras .	449	118	72	95	54	81	66	91	85	241	109
Lady Willingdon Medical School for Women, Madras.	95	44	18	18	12	27	21	20	20	42	13
Missionary Medical School for Women, Vellore.	92	29	12	11	8	29	23	...	...	58	32

Assam.

174. *Berry-White Medical School, Dibrugarh.*—236 students were on the rolls ; of these 51 appeared for the final examination and 24 passed. Of the 54 students, who appeared for the compounders examination, 35 passed.

Burma.

175. *Burma Government Medical School, Rangoon.*—The total number of students on the rolls was 168, these comprising 129 old students, 38 new admissions and one re-admission ; 65 students appeared for the final examination Part II and 35 passed.

The Countess of Dufferin's Fund.

176. A total of 367 women students were on the rolls in different Medical Colleges in India ; 27 scholarships were awarded, 18 at the Lady Hardinge Medical College, Delhi ; 3 at Bombay ; 3 at Madras ; and 3 at Calcutta. Of these scholarships 18 were awarded from Association funds and the remainder from trust funds administered by the Dufferin Council.

The extent of work done in Dufferin Hospitals may be estimated from the following figures :—

New in-patients	157,152
New out-patients	2,166,510
Out-patients (old and new)	6,214,693
Gynaecological cases—	
Indoor	10,812
Outdoor	82,362
Midwifery cases—	
Abortion	1,704
Normal labour	8,819
Abnormal labour	2,772
Operations—	
Abdominal	1,249
General or spinal anaesthesia	11,633

SECTION X.

HEALTH OF JAILS IN INDIA.

Population, Sickness and Mortality Rates.

177. The decline in the average daily population (excluding that of the Andamans) experienced in 1933 as a sequel to the complete collapse of the civil disobedience movement was continued. The figure for 1934 was 141,895 being 3,542 less than in the preceding year but still 478 in excess of the quinquennial mean. Compared with 1933, the largest decreases occurred in the Bombay Presidency (—1,552), B. & O. (—1,468) and U. P. (—1,421), elsewhere reductions were small, but in Bengal the population again showed an increase of 2,615.

Table X (*i*) gives the authorised accommodation, the daily average population and the maximum population confined on any one day in jails and sub-jails during 1933 and 1934.

TABLE X (*i*).

	Authorised accommodation excluding hospitals and observation cells.		Daily average population.		Maximum number confined on any one day.	
	1934.	1933.	1934.	1933.	1934.	1933
N.-W. F. P. . .	5,024	5,053	6,351	6,838	7,260	7,764
Punjab . . .	15,013	15,013	21,849	22,378	26,370	28,134
U. P. . . .	32,053	32,081	31,925	33,346	32,650	35,321
B. & O. . . .	13,730	13,730	12,431	13,562	18,988	20,121
Bengal . . .	18,304	18,151	21.851	21,405	28,969	30,073
C. P. . . .	6,518	6,518	4,793	4,901	5,924	6,311
Bombay . . .	19,275	20,186	14,510	19,085	22,647	24,750
Madras . . .	20,123	20,316	14,959	14,761	13,466	13,634
Assam . . .	3,581	3,508	4,009	3,804	4,818	4,707
Burma . . .	20,362	20,197	20,477	21,145	22,525	25,519

Abbreviations :—

N.-W. F. P.—North-West Frontier Province.

B. and O.—Bihar and Orissa.

U. P.—United Provinces of Agra and Oudh.

p.m.—*per mille.*

C. P.—Central Provinces and Berar.

I. G. of P.—Inspector General of Prisons.

C. s. fever—Cerebro-spinal fever.

P. U. O.—Pyrexia of uncertain origin.

178. On the whole, 1934 was a healthy year. The constantly sick rate, exclusive of the Andamans, fell from 22 p. m. in 1933 to 21 p. m., the quinquennial mean being 23 p. m. Excepting Bengal, C. P. and Bombay, all provinces recorded decreases. In Bengal, the high sick rate is associated with marked overcrowding; in the C. P., influenza prevailed in epidemic form in Nagpur, Chhindwara and Raipur jails; and in Bombay, where the increase was small, c. s. fever in the jails of Sind swelled the figure.

179. Excluding the Andamans, the "admission to hospital rate" dropped from 560 p. m. in 1933 to 541 p. m. and was lower than the quinquennial mean, 587 p. m. In N.-W. F. P., Punjab, U. P., B. & O., Madras, Assam and Burma the rate was below that for 1933 and the mean; in Bengal it was lower than in 1933 but was higher than the mean; in the C. P. it was in excess of the rate for 1933 and the mean. Bengal, with its overcrowded jails, again returned the highest rate, *viz*, 1,079 p. m.; while the lowest admission rate was reported in Burma, 179 p. m.

The Andamans recorded a rate of 567 p. m. as against 552 p. m. in 1933 and 753, the quinquennial mean.

180. There was an increase in the death rate from 11 p. m. in 1933 to 12 p. m. as against 12 p. m., the quinquennial mean. Death rates were higher than in 1933 in B. & O., C. P., N.-W. F. P., Bombay, U. P., Bengal, Punjab and Madras; lower in Assam and Burma. In B. & O. the high death rate which exceeded that for 1933 by 5 p. m. was ascribed in part to disease in the Gaya central jail resulting from the use of diseased rice; in the C. P. to the greater incidence of anæmia and debility, diarrhœa and respiratory diseases; in N.-W. F. P. to the prevalence of pneumonia; in Bombay to c. s. fever in the overcrowded central jail at Ahmedabad and in the Shikarpur special prison. The increases in other provinces were small, but further details will be found on pages 253—63.

The highest death rate, 20 p.m., was again reported in the Hills and the lowest, 8 p. m., on the Western Coast.

Causes of Sickness and Mortality.

181. The principal recorded causes of sickness, exclusive of the Andamans, are given in their order of priority in Table X (*ii*).

TABLE X (*ii*).

	1933.		1934.	
	Admissions.	Rate. p. m.	Admissions.	Rate. p. m.
Malaria	25,018	172	21,622	152
Influenza	4,536	31	5,667	40
Abscess, ulcer and boil	5,001	34	4,982	35
Dysentery	5,121	35	4,746	33
Respiratory diseases*	4,357	30	4,329	31
Diarrhœa	2,898	20	2,834	20
Pneumonia	1,504	10	1,614	11
P. U. O.	1,343	9	1,132	8
Anaemia and debility	1,179	8	1,089	8
Tubercle of the lungs	815	6	831	6
Sandfly fever	669	5	406	3
Dengue	155	1	265	2

*Excluding tubercle of the lungs and pneumonia.

TABLE X (*ii*)—*contd.*

	1933.		1934.	
	Admissions.	Rate p. m	Admissions.	Rate p. m.
Enteric fever	331	2	243	2
C. s. fever	106	1	130	1
Spleen diseases	94	1	60	..
Smallpox	56	..	54	..
Phagedaena, slough and gangrene	29	..	41	..
Cholera	5	..	26	..
Hepatic abscess	13	..	25	..
Scurvy	31	..	12	..

A decrease of 20 p. m. in the admission rate from malaria, was offset by an increase of 25 % in admissions from influenza.

Pneumonia and tubercle of the lungs continue to be the chief causes of death. The increase under the latter occurred mainly in the Punjab, where 34 deaths took place among cases transferred to the new Multan central jail in a late stage of the disease.

Pneumonia increased chiefly in the N.-W. F. P. where unusually severe cold was experienced in December. Table X (*iii*) below gives the deaths and the rates *p. m.* during 1933 and 1934.

TABLE X (*iii*).

	1933.		1934.	
	Deaths.	Rate p. m.	Deaths.	Rate p. m.
Pneumonia	328	2·3	392	2·8
Tubercle of the lungs	241	1·7	308	2·2
Dysentery.	111	0·8	112	0·8
Malaria	83	0·6	82	0·6
C. s. fever	54	0·4	73	0·6
Respiratory diseases	53	0·4	70	0·5
Enteric fever	38	0·3	41	0·3
Anaemia and debility	50	0·3	46	0·3
Influenza	18	0·1	26	0·2
Diarrhœa	34	0·2	25	0·2

182. *C. S. Fever.*—There were 130 cases with 78 deaths as against 106 and 54 in 1933. Of these 63 cases and 30 deaths were recorded in the Punjab jails; 32 and 26 in Bombay Presidency; 10 and 9 in B. & O.; 9 and 5 in Delhi; 9 and 4 in N.-W. F. P.; 4 and 2 in Bengal; 2 and 2 in Burma; and 1 non-fatal case in the C. P. Further details will be found in paragraphs 195—205.

183. *Influenza.*—Bengal Presidency suffered most with 2,243 admissions; next U. P. with 1,204 admissions; then Madras with 437; B. & O. 352, Burma 336, and Punjab 322. Elsewhere the incidence was low. Admission rates for the period, 1930-34, are given in Table X (*iv*).

TABLE X (*iv*).

	Admission rates *per mille*.				
	1930.	1931.	1932.	1933.	1934.
India	**33·9**	**51·0**	**34·0**	**30·4**	**39·0**
N.-W. F. P.	53	23	18	6	**23**
Punjab	18	47	10	3	**16**
U. P.	24	49	39	28	**38**
B. & O.	48	82	28	23	**35**
Bengal	73	114	106	107	**116**
C. P.	42	45	10	52	**55**
Bombay	20	10	9	3	**18**
Madras	33	53	56	60	**37**
Assam.	47	97	45	28	**27**
Burma	46	62	22	17	**17**
Andamans	3	2	3	14	**18**

184. *Cholera.*—The number of cases increased from 5 in 1933 to 35 and the deaths from *nil* in 1933 to 7 this year. These comprised 21 cases with 4 deaths in the U. P., 6 and 1 in B. & O., 4 and 1 in Bengal, 2 and 1 in C. P. and 2 non-fatal cases in Burma.

185. *Smallpox.*—54 admissions with 1 death were reported as against 56 and 2, respectively, in 1933. The U. P. recorded 24 cases with 1 death; and other provinces registered :—Burma 9 cases, B. & O. 7, Punjab and Bengal 5 each, C. P. 3 and Madras 1.

186. *Plague.*—Except for two fatal cases in Burma jails, this disease was absent.

187. *Enteric Fever.*—Of 243 admissions with 41 deaths, 47 and 6 occurred in the Punjab, 38 and 5 in Burma, 30 and 8 in Bengal, 30 and 4 in N.-W. F. P., 26 and 5 in B. & O., 23 and 2 in U. P., 12 and 2 in Assam, 8 and 3 in Delhi, 6 and 1 in Madras and 3 non-fatal cases in the C. P.

188. *Kala-azar* admissions numbered 280 and of these 17 were fatal—191 and 11 respectively in Bengal, 66 and 5 in B. & O., 10 and 1 in U. P., 12 non-fatal cases in Assam and 1 non-fatal case in Madras.

189. *Dysentery.*—Bengal again headed the list with 1,273 admissions and 28 deaths, followed by Punjab 633 and 12, Bombay Presidency 625 and 4, U. P. 498 and 14, B. & O. 447 and 15, Madras 422 and 15, Assam 395 and 7, N.-W. F. P., C. P. and Burma reported low incidences. In B. & O., Madras, Assam and Burma the admission rate was lower than that for 1933 and the quinquennial mean; in Bengal it was higher.

Comparing the geographical groups, the largest number of admissions was again recorded in Bengal and Orissa (1,370), followed by North-West Frontier, Indus Valley and North-West Rajputana (707), Gangetic Plain and Chota Nagpur (681), the upper Sub-Himalayan region (499), Assam (391), Southern India (293), Western Coast (192), the coast of Burma and Bay Islands (129), the interior of Burma (64) and Hills (18). The incidence *per mille* of average population is given in Table B on pages 344-45.

190. *Diarrhœa.*—Bengal leads once more with 1,211 admissions or nearly 43% of the total as against 933 or nearly 32 % of the total in 1933. The only other provinces recording a notable incidence were U. P., Bombay and Punjab with 475, 394 and 313 admissions, respectively.

Comparing geographical groups, Bengal and Orissa continued to return the highest admission rate of 62 p. m. Other areas reporting high incidence included the Deccan (27 p. m.), Western Coast (24 p. m.), Gangetic Plain and Chota Nagpur (17 p. m.) and the Upper Sub-Himalayan Region (17 p. m.). The provinces of Madras (2 p. m.) and Burma (2 p. m.) continue as usual to return the lowest rates for this condition.

Table X (*v*) gives combined figures for dysentery and diarrhœa.

TABLE X (*v*).

	Admission rate p. m.			Death rate p. m.		
	Mean 1929-33.	1933.	1934.	Mean 1929-33.	1933.	1934.
India	**61**	**54**	**52**	**1**	..	**1**
N.-W. F. P. . .	24	27	**18**	..	1	..
Punjab . . .	50	58	**48**	1	2	**1**
U. P.	33	28	**30**	1	..	**1**
B. & O. . . .	117	98	**64**	2	2	**2**
Bengal . . .	113	121	**129**	2	1	**2**
C. P.	72	37	**50**	2	1	**2**
Bombay . . .	85	70	**83**	1	..	..
Madras . . .	48	41	**38**	1	2	**2**
Assam. . . .	155	156	**110**	4	2	**2**
Burma . . .	34	17	**12**	3	1	**1**
Andamans . . .	31	31	**32**	5	2	**1**

The combined admission rate exceeded that for 1933 and the mean in Bengal and the Andamans and was lower than both in N.-W. F. P., Punjab, B. & O., Madras, Assam and Burma. In the U. P., C. P., and Bombay it was higher than in 1933 but remained well below the mean.

191. *Malaria.*—Malaria incidence was less this year than in 1933 ; compared with the quinquennial mean the admission rate for 1934 was nearly 10% less. All provinces shared in the decrease except Bombay where the incidence was 317 p. m. as against 298 p. m. in 1933 and 225, the mean. In Bengal the admission rate though considerably lower than in 1933, was still somewhat higher than the mean. The Andamans reported a rate of 260 p. m. as compared with 245 p. m. in 1933 and 396, the mean.

Burma, Madras Presidency, C. P. and B. & O. continued to record the lowest incidences.

Comparing geographical groups, Bengal and Orissa continued their lead with an admission rate of 262 p. m. Other high rates were Andamans (260 p. m.), the Upper Sub-Himalayan region (258), North-West Frontier, Indus Valley and North-Western Rajputana (246), South-Western Rajputana

Central India and Gujarat (187) and Western Coast (169). As usual, the jails in Burma and Southern India escaped lightly.

The malaria death rate was highest in the Andamans (1·7 p. m.), the Punjab (1·2) and Bengal (1·2). In other provinces the rates varied between 0·9 p. m. in N.-W. F. P. and 0·1 p. m. in the U. P.

192. *Pneumonia.*—Of the total 255 admissions and 60 deaths were registered in the Punjab, 233 and 65 in the U. P., 212 and 48 in N.-W. F. P., 203 and 42 in Bombay Presidency, 167 and 31 in Burma, 143 and 44 in B. & O., 73 and 21 in Assam, 37 and 13 in Madras and 33 and 11 in the C. P.

The N.-W. F. P. continued to show the highest admission rate (33 p. m.) and Madras the lowest (3 p. m.). Other provinces recording high incidence were Assam (18 p. m.), Bombay (17 p. m.), B. & O. (14 p. m.) and Punjab (13 p. m.).

The N.-W. F. P. headed the list of mortality rates, followed by Assam (5·2 p. m.), B. & O. (4·4 p. m.), Bombay (3·5), Punjab (3·0), C. P. (2·9), Bengal (2·6), U. P. (2·0), Burma (1·5), Madras (1·1) and Andamans (1·0).

193. *Tubercle of the lungs.*—In India proper, excluding the Andamans, the admissions 831 and deaths 308 were higher than in 1933 (815 and 241) but lower than the 5-year means of 972 and 286 respectively.

The admission rates were :—N.-W. F. P. 10 p. m.. B. & O. 9 p. m., Punjab and Assam 8 p. m. each, Burma and Bengal 6 p. m. each, C. P. and Madras 5 p. m. each, U. P. and Bombay 3 p. m. each; and death rates :—Punjab 3·9 p. m., B. & O. 3·8 p. m., N.-W. F. P. 3·1 p. m., Burma 2·1 p. m., Madras 2·0 p. m., Bengal 1·9 p. m., C. P. and Assam 1·7 p. m. each, Bombay 1·3 p. m., U. P. 1·2 p. m. In the Andamans admissions 23 and deaths 12 were less than in 1933 (36 and 14 respectively).

Provision existed for the segregation and treatment of tubercular patients as follows :—

N.-W. F. P.—Abbottabad jail has a ward containing 40 beds.

Punjab.—As in previous years, prisoners suffering from tuberculosis were concentrated in the Multan new central jail (136 beds), but some cases were also treated in other institutions, *e.g.*, Multan old central (8 beds), Lahore Borstal (6 beds), Rawalpindi (8 beds), Ambala (6 beds), and Sialkot (2 beds).

U. P.—Sultanpur jail (146 beds).

B. & O.—Arrangements for housing tubercular cases exist at Bhagalpur (35 beds), Buxur (12 beds) and Gaya central (6 beds) jails. The district jails at Motihari and Purulia also provide 4 beds each.

Bengal.—Suri jail has accommodation for 34 cases.

C. P.—Chhindwara jail (22 beds).

Bombay Presidency.—Special provision exists in the central jails at Belgaum (18 beds), Yeravda (8 beds), Ahmedabad (6 cells) and Hyderabad (3 cells) and in the Karachi district jail (3 beds).

Madras Presidency.—Long term prisoners, fit for transfer, are removed to the Wellesley Sanatorium jail, Bellary ; arrangements also exist in other jails for advanced cases not fit to undertake a journey to Bellary.

Assam.—Sylhet jail (20 beds).

Burma.—The Myingyan jail tubercular ward with 50 beds. Accommodation is also provided at Rangoon and Insein (20 beds each), Myaungmya

(8 beds), Thayetmyo and Moulmein (5 beds each), Akyab, Tharrawaddy, Bassein and Toungoo (4 beds each), Henzada (3 beds), and Mandalay (2 beds).

Weight of Prisoners.

194. Table X (*vi*) shows in percentages the condition of prisoners on discharge in the different provinces. The table is arranged in the order of loss of weight.

TABLE X (*vi*).

Provinces.	Gained weight.	Stationary.	Lost weight.
Andamans	45	14	41
Aden	40	23	37
Bombay	51	25	24
B. & O.	52	29	19
Bengal	50	36	14
Burma	63	24	14
Assam	55	33	12
C. P.	62	26	12
U. P.	57	33	10
Punjab	45	47	8
N.-W. F. P.	60	33	7
Madras	70	23	7
Coorg	84	15	1

In the Punjab 74% of the prisoners released were reported to be in good health, 25% in indifferent and only 1% in bad health. These compare favourably with the conditions of health recorded on admission to jails, *viz.*, 70% in good, 29% in indifferent and 1% in bad health.

In the Madras Presidency, Salem again recorded the largest percentage of those who lost weight (29%), followed by Bellary central (25%), Vizagapatam (20%), and the Presidency jail for women, Vellore (18%), whilst Berhampore district (0·12%), Trichinopoly central (0·17%), and Palamcottah Borstal (0·83%) jails recorded the lowest percentages.

Special Remarks on Provinces.

195. *N.-W. F. P.*—The numbers of jails and lock-ups remained unchanged, *viz.*, 3 central, 3 district and 9 subjails, the former six jails providing for 4,921 male and 103 female prisoners, whilst the maximum numbers confined on any one day was 7,154 and 106, respectively.

Despite overcrowding, the general health of the inmates was exceptionally good. The daily average population of 7,270 in 1933 fell to 6,780 but this figure was still in excess of the quinquennial mean of 6,314.

On grounds of sickness 22 releases were made as against 68 in 1933. Whilst admissions of convicts to hospital diminished from 4,110 in 1933 to 2,867, deaths rose from 78 to 91 on account of higher mortality from pneumonia in December when this province experienced unusual cold. The daily average sick rate was 31 p. m., males 30 p. m., females 67 p. m. The hospital admission

rate among females was also more than double the rate for males, *viz.*, 1,088 p. m. and 486 p. m. respectively. The death rates were males 15 p. m. and females 22 p. m.

The I. G. of P. has reported that a second suit of clothing was issued to prisoners this year and the high mortality from pneumonia in this province certainly suggests that the clothing or the bedding or both have been inadequate, particularly among women prisoners.

The major epidemic diseases were again absent.

Of the recorded deaths, 44 were due to pneumonia, 18 to pulmonary tuberculosis and haemoptysis due to tuberculosis; 6 to other respiratory diseases; 5 each to malaria and other tubercular disease; and 13 to other causes.

The continued fall in the prices of food grains has led to the dietary charges per head declining further to Rs. 29-13-9. The cost of sanitation also fell to Rs. 1-0-7, whilst comparatively more money was spent on the maintenance of hospitals, the figure being Rs. 233-13-4 per patient treated, and on clothing and bedding of prisoners (Rs. 11-5-0 per head).

196. *Punjab.*—The available jail accommodation, excluding hospital and observation cells, in 4 central, 1 Borstal, 18 district, 2 camp and 11 subjails provided for 14,367 male and 646 female prisoners. The daily average strength for all classes of prisoners was 21,849 (males 21,565 and females 284) and the maximum population confined on any one day was 26,370 (males 25,991 and females 379). The I. G. of P. has stressed the need for an additional central jail to relieve overcrowding of long-term prisoners and a special jail for tubercular cases.

The year was a fairly healthy one. Although the death rate increased slightly due to the prevalence of malaria and c. s. fever (in certain jails), the admissions to hospital, the daily average sick and the number of deaths all fell from 17,036, 510 and 314 to 16,160, 472 and 310, respectively. Jails recording high death rates included Multan new central (46 p. m.) in which tubercular patients from all over the province are concentrated, Ambala (37 p. m.), Jhang (35 p. m.), Shahpur (24 p. m.), Multan district (23 p. m.), and Rohtak (15 p. m.).

Malaria was the chief cause of sickness whilst tuberculosis and pneumonia were the most fatal diseases. Cholera, plague and relapsing fever were absent. Malaria caused 5,272 admissions and 27 deaths as against 6,349 and 16, respectively, in 1933. The decrease was ascribed to the fact that this year instead of the prophylactic use of quinine on large scale, special attention was given to measures for the destruction of mosquitoes and the prevention of breeding. In addition to the medical inspection on admission to jail, prisoners were examined for enlarged spleen once in July, August, September and October. Tuberculosis produced 197 admissions and 83 deaths, 60 deaths occurring in the special ward attached to the new central jail, Multan. Pneumonia accounted for 281 admissions and 66 deaths; its incidence and mortality have increased markedly.

C. s. fever was responsible for 61 admissions with 28 deaths principally in Lahore central and Borstal jails and in Jhang. Of 503 dysentery admissions and 11 deaths, 108 and 3 occurred in the Multan district jail alone, 80 non-fatal cases each in Lahore central and Ludhiana district jails and 20 and 3 in Ambala.

Fortyseven convicts developed insanity and were transferred to the mental hospital. Five old and 10 new lepers were treated in the special ward attached to the district jail, Mianwali.

Dietary charges dropped from Rs. 31-7-7 to Rs. 22-10-7 per head (excluding civil prisoners), clothing and bedding charges from Rs. 9-2-1 to Rs. 7-7-6 and the sanitation charges from Rs. 3-7-4 to Rs. 2-14-2, whilst the hospital charges rose from Rs. 417-10-5 to Rs. 419-14-6 per head of average number sick.

197. *U. P.*—The daily average population of the 56 jails in this province declined from 33,346 to 31,925. The total available accommodation for convicts alone was sufficient for 27,287 males and 1,326 females as compared with the average daily population of 26,682 and 350, respectively. The largest population (all classes) on any one day was 32,650 in September.

The improvement in health conditions recorded in the previous year was well maintained during 1934. Both the admissions to hospital, 14,656, with a rate of 459 p. m. and the daily average number of sick, 607 or 19 p. m., continued down.

The main causes of sickness were malaria 3,440 admissions, abscess, boil and ulcer 1,510, " Other respiratory diseases " 1,121, diarrhœa 398, dysentery 359, pneumonia 189, anaemia and debility 126, and tuberculosis 120. Pneumonia (56) and tuberculosis (42) were the cause of nearly 40% of the total deaths. Other causes included dysentery 12, " other respiratory diseases " 10, malaria and diarrhœa 4 each, abscess and cholera 3 each and debility 2. Of the 20 admissions for cholera 16 with 3 deaths were in the Naini central prison. Except for one non-fatal case in the Bareilly district jail, plague was absent.

Epidemiological investigations were carried out into the prevalence of malaria in the central and district jails, Bareilly, and into the high incidence of typhoid fever in the Gorakhpur district jail.

Leprosy cases were, as usual, concentrated in the Rae Bareli district jail, old and new cases numbering 80 and 38, with no deaths. Except 3 burnt out cases, all were given injections of iodised esters of hydnocarpus oil with satisfactory results.

Dietary charges fell to Rs. 27-13-1, hospital charges (per head of average number of sick) to Rs. 105-14-10, and clothing and bedding charges to Rs. 3-0-6, while the expenditure on sanitation increased from Rs. 49,468 in 1933 to Rs. 52,749, due to certain improvements of jail watersupplies.

198. *B. & O.*—The 4 central, 12 district, 1 juvenile and 50 subsidiary jails provided accommodation for 12,151 convicts, 1,461 undertrial and 118 civil prisoners. In order to relieve overcrowding, which persisted in nearly all the jails throughout the year, the sub-jails at Arrah, Chaibassa, Balasore and Daltonganj continued to be used as district jails and the subjail at Gulzarbagh which was closed in 1932 was reopened for about 5 months. The camp jail at Patna was however closed in March, 1934, and the juvenile jail at Monghyr which was damaged by the earthquake was under reconstruction.

Compared with 1933, the daily average population dropped by 8% but was still 71% above normal years (up to 1929). The convict wards were on the whole much less overcrowded this year as the average daily population

aggregated 10,204 with an accommodation for 12,151 prisoners. Admissions to hospital (5,241) and daily average number of sick (284), were considerably lower than in 1933 but the number of deaths and the death rate rose to 230 and 18 p. m., respectively, due mainly to bad health conditions in the Gaya central jail, where 58 deaths or about $\frac{1}{4}$th of the provincial total occurred. In this central jail the high sickness and mortality was ascribed chiefly to the feeding of prisoners on diseased rice which was considered unfit for human consumption. Other jails recording high mortality were Bhagalpur central (23·5), Purnea district (57 p. m.), Sambalpur (43 p. m.), Motihari (31 p. m.), Cuttack (21 p. m.), and Monghyr (20 p. m.).

Seven sporadic cases of cholera with 2 deaths were reported and prompt measures were taken to arrest spread.

Of the 9 sporadic cases of c. s. fever with 8 deaths, 6 and 4, respectively, occurred in the Gaya central jail; 2 cases and 3 deaths at Bhagalpur central jail; and one fatal case at Bankipur. Dysentery cases numbered 593 and deaths 17. Malaria was responsible for 649 admissions and 4 deaths as against 1,041 and 6, respectively, in 1933; influenza 465 cases with 6 deaths; pneumonia 148 and 44; diarrhœa 277 cases; abscess, ulcer and boil 156; "other respiratory diseases" 276 and 6.

Ankylostomiasis accounted for 432 admissions and 28 deaths, Gaya alone recording 112 cases with 11 deaths and Bhagalpur 75 cases with 6 deaths. The examination of newly admitted prisoners for hookworm infection was continued and of 17,816 cases examined, 7,617 were found positive.

The incidence of pulmonary tuberculosis rose from 73 cases with 30 deaths in 1933 to 108 and 38, respectively.

Leprosy cases were as before segregated in the Muzaffarpur district jail. The daily average number of cases was 44.

The cost per head on diet, hospital, clothing and bedding, and sanitation, all decreased to Rs. 31-1-0, Rs. 4-7-0, Rs. 5-5-0 and Rs. 1-14-0 respectively.

199. *Bengal Presidency.*—During the year, there was general overcrowding particularly marked in the central jails. In order to afford some relief, the 3 special jails at Dum Dum and Hijli continued open and, consequent on the release or transfer of civil disobedience movement female prisoners, the Berhampore female jail was converted into a juvenile jail with additional accommodation for 215 male juvenile prisoners. Excluding hospital and observation cells, there existed accommodation for 18,304 prisoners (17,672 males and 632 females) and including the temporary accommodation it was sufficient for 20,232 prisoners. The daily average population was 21,851 (21,615 males and 236 females), the highest in the last 10 years except in 1932, whilst the maximum population confined on any one day was 28,431 males and 538 females. The daily average convict population aggregated 17,279 (male 17,095 and female 184), whilst the maximum number confined on any one day was 21,024 (20,664 males and 360 females).

As is to be expected in such circumstances, sickness and mortality curves showed an upward trend. The daily average number of sick rose from 762 (35·6 p. m.) to 789 (36·1 p. m.) and the number of deaths from 233 (11 p. m.) to 282 (13 p. m.). The death rates for individual jails varied from 44 p. m. in Jalpaiguri to 4p. m. in Berhampore.

Cholera was responsible for 4 admissions with 1 death, as against 3 non-fatal cases in 1933.

Whilst the incidence of malaria fell to 4,785 admissions and 22 deaths, that of pulmonary tuberculosis rose from 90 admissions and 26 deaths to 103 and 26. Comparative figures for other diseases are shown below :—

TABLE X (*vii*).

	1933.		1934.	
	Cases.	Deaths.	Cases.	Deaths.
Other tubercular disease . . .	5	7	6	2
Anaemia and debility . . .	356	11	354	13
Pneumonia	176	43	196	48
Other respiratory disease . . .	686	2	727	13
Diarrhœa	1,122	3	1,071	3
Abscess, ulcer and boil . . .	1,026	1	911	1
Other causes	8,236	63	9,202	79

High mortality from dysentery, pneumonia and other respiratory diseases was partly due to the serious overcrowding ; that under pulmonary tuberculosis was probably due to the admission of cases in advanced stages of the disease when treatment is of little benefit.

The manufacturing section of the Presidency jail issued 41,976 lbs. of quinine and cinchona in addition to 87,140 boxes of quinine treatments.

The Bengal After-Care Association and its district ramifications continued their useful work.

Dietary charges per head further fell from Rs. 41 to Rs. 39-12 ; hospital charges from Rs. 225-12 to Rs. 200-7 (per head of average sick) ; and sanitation charges from Rs. 3-1 to Rs. 2-15 ; whilst expenditure on the clothing and bedding of prisoners remained stationary.

Expenditure on jail buildings amounted to Rs. 2,81,569, original works consuming Rs. 35,164 only.

200. *C. P. & Berar.*—Two central, 10 district and 9 subsidiary jails, excluding hospital and observation cells, continued to provide accommodation for 6,086 male and 432 female prisoners. The total average jail population further fell to 4,793 and the number of convicted persons admitted into prisons was 6,990. The number of prisoners sentenced under the Borstal Act was 83.

The year was not as healthy as 1933 owing to the prevalence of influenza in epidemic form at Nagpur, Chhindwara and Raipur jails. The admissions to hospital, 1,396 or 291 p. m., the daily average sick 53 or 11 p. m. and deaths, 70 or 15 p. m. all increased as compared with the previous year. Although cholera prevailed in several districts, only two cases, of which one was fatal, occurred in the jail population. Dysentery with 156 admissions and malaria with 171 were the chief causes of sickness ; pneumonia accounted for 36 admissions, diarrhœa 75, tuberculosis of the lungs 25, and c. s. meningitis for one non-fatal case. Of the total deaths, pneumonia was the cause of 12, pulmonary tuberculosis and haemoptysis due to tuberculosis 8, dysentery and anaemia and debility combined 5 each, diarrhœa 4, malaria 1 and other causes 35.

The Nagpur central jail continued to meet the steady increase in demand for quinine and cinchona as is evident from the quantities issued during the year, *vide* statement below :—

TABLE X (*viii*).

	1932.	1933.	1934.
	lbs.	lbs.	lbs.
Quinine sulphate . . .	562	641	652
Cinchona febrifuge . . .	591	619	558
Quinine hydrochloride . . .	24	29	25
Quinine tablets . . .	227	346	292
Cinchona tablets . . .	158	185	184
No. of quinine boxes . . .	2,626	2,965	3,176

The Discharged Prisoners' Aid Societies at Nagpur and Amraoti continued to render useful service.

The dietary and hospital charges further dropped from Rs. 25-14-3 and Rs. 498-6-11 to Rs. 24-4-11 and Rs. 397-10-11, respectively ; the clothing and bedding and sanitation charges rose from Rs. 6-11-11 and Rs. 2-9-8 to Rs. 7-2-11 and Rs. 3-0-7, respectively.

201. *Bombay Presidency.*—In this province, conditions have returned to normal in all prisons following complete cessation of civil disobedience and the release of practically all prisoners convicted of offences connected with it. Consequently the daily average population decreased from 16,238 to 14,510. Only 6 releases were made on medical grounds. Adolescent admissions between the ages of 16 and 21 dropped to 1,941 males and 114 females. The special juvenile section at Yeravda was developed to follow as far as possible Borstal lines.

The available accommodation provided for 19,275 prisoners (16,532 males and 2,743 females) whilst the maximum population confined on any one day was 21,741 male and 906 female prisoners, as compared with 25,506 and 1,244, respectively in 1933. As a result of a rise in the subsoil water level, the Shikarpur special prison showed signs of rapid disintegration. The scheme for the conversion of Visapur prison into a permanent prison farm was still under consideration of Government. Plans and estimates for a new sub-jail at Nawabshah were technically approved ; those for the conversion of an old liquor house at Nasik into a sub-jail were under consideration. The jails where the daily average population was in excess of the available accommodation are again those in which overcrowding has been serious in previous years—a feature which merits consideration.

TABLE X (*ix*).

	Authorised accom-modation.	Daily average population.
H. M.'s House of Correction	244	261
Bijapur district	345	351
Ahmedabad central	1,264	1,441
Hyderabad central	1,527	1,628
Sukkur district	448	568
Shixarpur special	464	472

Whilst the number of admissions and the average daily number of sick fell from 11,217 and 315, respectively, to 11,197 and 290, the constantly sick rate per 1,000, the total number of deaths and the death rate *p. m.* rose from 19·8, 171 and 10·8 in 1933 to 20·5, 179 and 12·6 respectively. Ahmedabad central and Visapur temporary jails were mainly responsible for the increase in mortality although the highest death rate, 49 *p. m.*, was recorded at Shikarpur special jail.

Cholera was absent. Plague was responsible for two fatal cases in the sub-jails at Satara and Tasgaon. Influenza admissions numbered 222; mumps 28; chickenpox 7; erysipelas one fatal case; typhoid 14 cases with 3 deaths; and para-typhoid 3 cases.

Eight cases of scurvy were reported from Sind jails.

Cerebro-spinal fever was again confined to the Sind jails which recorded 32 admissions with 26 deaths, as against 26 and 20 in 1933. These included Shikarpur special 16 cases with 14 deaths, Sind convict gang 9 and 7, Hyderabad central 4 and 3 and Sukkur district 3 and 2. The Inspector General of Prisons remarks:

> "This disease (c. s. fever) appears to be endemic in Sind and practically every year it makes an appearance in one or other of the jails there. Shikarpur prison appears to be particularly bad in this respect—and some of the earliest reports on this disease in India are in connection with the appearance of meningitis in Shikarpur prison (Dimmock)."

> "Prophylactic inoculation appeared to have had very good results."

Dysentery and diarrhœa together were responsible for 929 admissions and 3 deaths; tuberculosis of the lungs for 45 and 18 as against 51 and 17 in 1933.

Malaria was the cause of 3,598 cases and 4 deaths, Visapur temporary prison and Yeravda central jails recording fewer cases this year. Ahmedabad and Hyderabad central prisons had increased incidences. In the former the increase was attributable directly to the late rains, whilst in the latter 33% of the prisoners were found to have enlarged spleens. Quinine tablets continued to be manufactured at the Yeravda central prison.

Pneumonia caused 189 admissions with 41 deaths.

Prisoners' Aid Societies continued to work in Bombay, Ahmedabad, Bijapur, Poona and Belgaum.

Dietary charges per head rose slightly to Rs. 36-11-8; hospital, clothing and bedding and sanitation charges fell to Rs. 2-5-3, Rs. 2-10-0 and Rs. 5-9-9, respectively.

Twelve male and 2 female prisoners were transferred to mental hospitals.

202. *Madras Presidency.*—Nine central, 3 district, 2 Borstal, 3 special and 301 sub-jails provided accommodation for 20,123 prisoners (18,352 males and 1,771 females). The daily average population of all classes of prisoners was 14,614 male and 345 female prisoners, that of convicts 11,443 and 282, respectively. Only 19 prisoners were released on medical grounds. Other releases included 4 female prisoners, who had been convicted of infanticide; these were made over to the Madras Seva Sadan and the rescue home of the Salvation Army.

Adolescents detained in the Borstal schools at Tanjore and Palamcottah numbered 989. As in previous years, ambulance and first-aid training was provided; of the 522 new admissions under training 75 obtained certificates.

The downward trend of 1933 in the number of admissions to hospital, and the daily average number of sick was maintained, the figures being 3,925 (262 p. m.) and 207 (14 p. m.) respectively. The female admission rate (310 p. m.) was in excess of the male, 261 p. m. The number of deaths further rose to 158 and the death rate to 11 p. m., due chiefly to the admission of a large number of prisoners in bad and indifferent health. Of the total deaths, 137 occurred among convicts, 18 among under-trials and 3 among civil prisoners; 28 occurred in Trichinopoly central, 20 in Vellore, 17 in Rajahmundry, 12 in Madras Penitentiary, 11 in Coimbatore, 10 in Salem, 9 in Vizagapatam, 7 in Cannanore, Berhampore 8, Presidency jail for women, Vellore 6, Madura district jail 5, Bellary and Cuddalore 4 each.

Cholera was again absent. Dysentery caused 388 admissions, of which 121 were treated in the Cannanore central jail alone. Although the origin of infection could not be traced, the disease was reported by the Inspector General to have been kept well under control by the daily administration of dysentery phage to the whole population.

The number of admissions from malaria fell to 196, and included 89 in Bellary and 40 in Trichinopoly central jails.

Tuberculosis continued widespread in all jails except at Vizagapatam and Madura and the Tanjore and Palamcottah Borstal Schools, but the recorded admissions and deaths, 57 and 22, respectively, were lower than the figures for 1933.

Of 78 admissions and 6 deaths from anaemia and debility, Trichinopoly accounted for 20 and 4, respectively.

Pneumonia provided 33 admissions with 12 deaths; diarrhœa 20 and 3; enteric fever 7 and 1; and syphilis 20 and 1.

Only 10 admissions were ascribed to ankylostomiasis and the administration of a routine anthelmintic course to all prisoners on admission, unless otherwise contra-indicated, was continued.

The mental defectives section of the Cuddalore district jail dealt with 87 prisoners; the leper annexe of the Salem central jail had 141 inmates.

Protected water supplies were available in all central and district jails and Borstal schools.

Of the 28,083 prisoners released, the Discharged Prisoners' Aid Society rendered aid to 963.

The dieting, hospital, clothing and bedding, and sanitation charges all dropped to Rs. 35-13-6, Rs. 2-14-4, Rs. 4-10-2 and Rs. 3-11-8, respectively.

203. *Assam.*—Available accommodation providing for 3,971 prisoners increased by 138 over 1933 as a result of the construction of a leper annexe in the Sylhet district jail for 35 prisoners; the conversion of a portion of the old female ward into a male barrack to provide additional accommodation for 7 prisoners in the Dhubri jail; the addition of temporary accommodation for 80 and 20 prisoners respectively at Gauhati and Habiganj; and the construction of a female annexe in the South Sylhet district jail.

The daily average population was the highest on record being 4,009 or 204 more than in 1933 and included 3,354 convicts, 651 under-trials, 4 civil prisoners.

Although additional temporary accommodation was provided in some jails, a certain amount of overcrowding was inevitable as the available accommodation was already inadequate. Thus the problem of accommodation remained acute, especially in respect of cellular accommodation ; the temporary segregation of new admissions and the permanent segregation of habituals.

Admissions to hospital fell from 2,135 to 2,122 ; the admission rate p.m. from 561 to 98 ; the daily average sick from 98 to 87 ; the number of deaths and death rate from 62 and 20·3 p.m. to 58 and 19·6 p.m.

Of the total deaths, 54 occurred among convicts, giving a rate of 14·5 p.m. against 16·3 p.m. in 1933.

In the Assam Valley jails, 33% of the convicts were habitual drug takers and in the Surma Valley 7% as compared with 28% and 6%, respectively, in 1933.

Eight prisoners were transferred to the mental hospital.

Malaria (357 admissions) and dysentery (333) continued to be the main causes of sickness, whilst 19 deaths were ascribed to pneumonia, 7 each to pulmonary tuberculosis and dysentery, 2 to malaria and 1 to ankylostomiasis. The incidence of dysentery was again the highest in Gauhati (163 cases) ; that of malaria in Sylhet (75 cases).

Cases infected with hookworm were as before given suitable treatment ; of 3,797 cases examined in the jails, 811 or over 21% were found infected. Admissions to hospital numbered 42.

Dietary charges per head of population rose to Rs. 33-13-1 and the cost of hospitalisation alone came to Rs. 222-5-9 per head of average number sick. The expenditure on clothing and bedding and on sanitation was lower than in 1933, being Rs. 4-12-3 and Re. 0-10-0 per head of population.

A Discharged Prisoners' Aid Society was formed at Shillong.

204. *Burma.*—Nine central, 18 district, 1 camp and 4 subsidiary jails provided accommodation for 20,593 male and 324 female prisoners or a total of 20,917. The combined Borstal and Senior Training School at Thayetmyo continued to function. The Alôn camp jail was closed and the conversion of the Reformatory school buildings at Insein into a special jail for " A " and " B " class prisoners was sanctioned.

The daily average population was 20,477 (males 20,278 and females 199). Of prisoners discharged, 32 were released on grounds of sickness and 12 were sent to mental hospitals.

The health statistics for the year showed further improvement, admissions to hospital dropping to 3,668 or 1,358 less than in 1933, the daily average sick to 204 (224 in 1933), the admission to hospital rate to 179 p.m. (238 p.m. in 1933), the daily average sick rate to 10 p.m. (11 p.m. in 1933) and the number of deaths and the death rate to 196 and 10 p.m. (227 and 11 p.m. in 1933). Of the total deaths 93% were recorded among convicts ; 7% died within a week, 22% within 4 weeks of admission and 78% after more than a month's detention in jail. Three deaths occurred among prisoners who on admission were sent direct to hospital. 122 deaths occurred among prisoners aged 16-40 years, 65 among those between 40-60 years and 9 among those over 60 years of age.

Cholera was absent and only two fatal cases of plague were recorded.

Owing to more efficient chlorination of drinking water and greater attention paid to cleanliness, food, etc. the incidence of dysentery further fell to 180 admissions and 12 deaths.

Tuberculosis was responsible for 138 admissions and 49 deaths as against 98 and 54, respectively, in 1933. In the special ward at Myingyan, providing for 50 prisoners, 95 cases including 86 new admissions were treated. Of these 14 died, one within and 13 after 3 months of admission ; 28 cases were discharged cured.

Anaemia and debility was the cause of 36 admissions with 3 deaths, as against 63 and 5 in 1933.

Enteric fever was reported as the cause of 38 cases of which five proved fatal, and beri-beri of 4 (12 in 1933). In the case of the latter cases, the source of infection was extraneous.

Influenza caused 336 admissions with 1 death. Malaria incidence further decreased from 388 cases and 12 deaths to 220 and 5, respectively.

Admissions from ankylostomiasis numbered 2,837 with 1 death. All new admissions were, as usual, examined for ankylostome infection.

Over 4% of the convict population were opium addicts.

First-aid classes were held in 12 jails, and 6 jailors, 15 warders and 93 prisoners passed the prescribed test.

Dietary, hospital, clothing and bedding, and sanitation charges all decreased during the year.

205. *Andamans.*—The daily average population numbered 5,679 males and 80 females, as against 6,527 and 96, respectively in 1933. The barracks and cells, allowing 50 superficial feet per prisoner, had accommodation for 4,136 (4,076 males and 60 females), whilst the maximum population confined on any one day was 6,152 (6,061 males and 91 females).

A total of 3,268 admissions to hospital was recorded corresponding to a rate *per mille* of 552 as against 3,654 and 560, respectively in 1933. The average daily number of sick was 156 (176 in 1933) and the deaths numbered 83 against 118 in 1933.

The general health of the Settlement was good and is reflected in the diminished incidence particularly of malaria, (1,497 admissions and 9 deaths) following energetic anti-malarial measures. Other diseases showing decreased incidence are given below :—

TABLE X (*x*).

	1933.		1934.	
	C.	D.	C.	D.
Dysentery	162	13	147	7
Colitis	118	7	72	..
Weil's disease	36	6	29	5
Pulmonary tuberculosis	36	14	23	12
Anaemia	77	16	45	9
Sprue	17	3	4	2
Diarrhœa	40	1	32	..

Cholera was again absent.

Enteric fever was responsible for increased incidence this year, *viz.* 13 cases with 2 deaths (3 non-fatal cases in 1933). Influenza caused 106 admissions (93 in 1933).

Among the respiratory group, bronchitis accounted for 114 cases, asthma 43 and pneumonia 23.

Gonorrhœa and syphilis each was the cause of 33 and 15 cases against 45 and 21 in 1933.

Smallpox cases numbered 3 among the free population, the origin of these cases was traced to infection acquired in India.

Vaccinations performed totalled 1,562, of which 341 were primary, 221 secondary and 1,000 re-vaccinations.

Ships arriving from and departing to Indian ports were inspected as a routine.

Food and water supplies were satisfactory ; sanitation and conservancy arrangements were adequate.

Examination of school children was carried out half-yearly.

206. *Aden and Coorg.*—These reports again contained various items of value and interest but no detailed comment is necessary.

Conclusion.

207. Generally speaking the year was a normal one as regards the health of the jail population, the death rate being 12 *per mille* which is the average figure for the previous five years. In particular, in the Andamans, the drop in the death rate from 31, which was the mean of the previous five years, to 17 in 1933 and to 11 in the year under report is striking. The improvement in health conditions here is evidenced by a pronounced drop in admissions and deaths from such diseases as malaria, dysentery and colitis, pulmonary tuberculosis and Weil's disease. Of the provinces, Burma shows the greatest improvement in health conditions as measured by death rate, followed by Assam, while Bihar and Orissa shows the highest rise in death rate, an increase of $\frac{1}{3}$rd over the mean. For the most part the constantly sick rate bears out the same points, though in this case Bihar and Orissa shows a lower constantly sick rate than obtained either in 1933 or in the five-year mean.

Turning to communicable diseases, it is notable that while admissions are below the figures for 1933, the combined death rate of this group is slightly higher, due in part to an excessive mortality from pneumonia during the cold weather in the N.-W. F. P. jails.

The most notable increase among communicable diseases was that in cerebro-spinal fever which occupied this year the fourth place as a cause of mortality in this group. A slight upward trend in admissions and deaths of tubercle of lungs over the previous year's figures and the five-year mean is noted and should cause concern to the jail administrations of the provinces principally contributing to the rise, namely, the Punjab, the N.-W. F. P. and Bihar and Orissa.

There is every evidence that on the whole the high standard of care and attention to the health of prisoners, which characterises the administration of Indian jails by medical officers, has been well maintained throughout the year.

Health conditions within jails compare favourably with those outside.

SECTION XI.

INDIAN VOLUNTARY HEALTH ORGANISATIONS.

The Indian Red Cross Society*.

208. During the first half of 1934 both headquarters and the branches, particularly the Bihar and Orissa branch, were occupied with relief work for the Bihar earthquake sufferers. Red Cross Societies all over the world gave generous aid to the Indian Society.

Membership.—There were altogether 23 provincial and state and nearly 200 district Red Cross Committees at work at the end of 1934. The membership was 15,912, the largest increase over the figure for 1933 occurring in the Punjab from 5,575 to 8,949, and Sind won the " Flag of Honour " for the most enrolments during Red Cross week.

Prevention of Blindness.—Considerable progress was made during the year in the scheme which this Society is carrying out in cooperation with the National Institute for the Blind, London, for the training of teachers in the prevention of eye diseases. The National Institute have given a generous grant of £570 including £450 for organising eye courses for teachers and £120 for free distribution of literature.

With regard to the organisation of courses, it was decided to limit the work to training institutions. With the help of the medical sub-committee a syllabus was drawn up, and a uniform fee of Rs. 20 per course of two lectures arranged. The courses are being organised through provincial and state Red Cross branches, and free sets of lantern slides are being provided by headquarters. At the end of 1934 only a few courses had been held as the preliminary arrangements took some time but the scheme is now in full swing, and these courses should make a valuable contribution to the campaign for the prevention of eye diseases which the Junior Red Cross is carrying on throughout India.

With the £120 it was decided to print 10,000 copies in Bengali, 5,000 in Tamil and 5,000 in Telegu of the pamphlet, " The Prevention of Blindness," which had already appeared in English, Urdu, Hindi and Gujrati. The Tamil edition is ready and the Bengali and Telegu are in the press. All these pamphlets will be distributed free to schools in Bengal and Madras.

Maternity and Child Welfare Bureau.—Educational activities absorbed a good deal of the funds of this Bureau. In 1934 three schools for the training of health visitors were wholly or partly supported by the Bureau as well as two nursery schools. Assistance was also given to the welfare Centre which provides field work for the students taking the Diploma in Maternity and Child Welfare at the All-India Hygiene Institute at Calcutta.

In the absence of any officer doing whole time work on maternity and child welfare with the Government of India, the Bureau provides a central adviser on this subject for India, and so helps to co-ordinate the work in various provinces. The Bureau also provides literature and helps in the organisation of baby and health weeks.

The Victoria Memorial Scholarship Fund is ear-marked for the training of indigenous and other midwives. The number of trained midwives is gradually increasing, and it is hoped, that in time, this will help to reduce the enormous maternal mortality rate in India.

* Prepared from a note supplied by Miss Norah Hill, A. R. R. C., Secretary, Indian Red Cross Society.

Child welfare work in the army, though largely of the character of medical aid, is gradually assuming a more preventative outlook. The care thus given to the troops' families is greatly appreciated, and the work is warmly supported by the officers and their wives.

King George Thanksgiving (Anti-Tuberculosis) Fund.—During the year the educational and propaganda campaign against tuberculosis was carried on through 16 provincial and state anti-tuberculosis committees, Medical, Public Health and Education Departments, sanatoria, medical colleges and schools throughout India.

The outstanding event of the year was the bringing together for the first time of tuberculosis workers from all over India at the Tuberculosis Conference held in Delhi in November. Some interesting papers were read and stimulating discussions took place.

The coloured posters issued last year have proved very popular an another 5,000 copies have had to be printed. A new chart on "spitting,' in black and red, has been published. Some of the Fund's posters and pamphlets have been translated into Burmese and distributed through the Public Health and Education Departments throughout Burma. Two new films one entitled "Posture" and the other "Consequences," were purchased from America. Two copies of the film "Causation and Prevention of Tuberculosis," prepared by the Fund, were sold during the year.

A propaganda cinema lorry is being fitted up at headquarters to tour the provinces with films and carry out intensive propaganda. There will be a qualified medical man in charge.

Training grants were made to several medical institutions for special courses in tuberculosis.

Junior Red Cross.—The Junior Red Cross has achieved real popularity in India. It is an encouraging fact that the movement is now gaining ground in girls' schools, particularly in the Punjab.

Inter-school correspondence is also being taken up more widely, and this year 128 albums were exchanged with foreign countries, compared with 72 last year.

During the Bihar earthquake, Junior groups all over India gave valuable assistance in collecting both money and relief material, such as blankets and clothing.

A Junior Red Cross Conference was held in Sind and a Junior Red Cross and St. John Ambulance Camp in Lahore, both of which were well attended by teachers, the former by men and the latter by women.

Among the many interesting activities reported are prevention of blindness, propaganda, anti-epidemic work, rural hygiene and social service, while all groups continued their regular programme of practising health habits.

Publicity and Health Propaganda.—A Red Cross Week was held in February, 1934. In spite of the fact that the Bihar earthquake interfered with the universal celebration of the Week, flags and posters were sold in thousands. The silk "Flag of Honour," offered by headquarters for the branch enrolling most members during the Week, was won by the Sind provincial branch, which held its "week" in September, during which it carried on excellent anti-tuberculosis propaganda. About 432 new members were enrolled and over Rs. 4,000 added to the funds. Ajmer also held a very successful week.

The first standard film produced by the Cinema section at headquarters entitled "The Prevention of Blindness" has proved a great success. Two copies, one with English, Urdu and Hindi titles and one with English only, have been made for the headquarters circulating library, and four have been sold to Punjab, Calcutta, Cochin State and Baroda State. Work is now proceeding on two films, one describing the activities of the Indian Red Cross Society, and one on "Homecraft and Mothercraft".

Altogether 160 films were sent out from the Red Cross film circulating library of which 105 were standard-size and 55 were 16 mm. During the year two new films were bought, one "Plague, the Destroyer," produced by the Hyderabad Plague Officer, and the other "The King of Flies," produced by the U. P. branch. A number of films were also added to 16 mm. library.

In August the Government of India informed the Society that it had decided to exempt educational films from customs duty.

The Red Cross journal had a fairly successful year. A coloured supplement (Red Cross week posters) was issued in January and pictorial supplements in April and July. One of the best health propaganda efforts throughout India is the "Health Welfare Week" sponsored by the Bengal Red Cross. This year, in addition to a most successful Calcutta Health Exhibition, which won the Irwin Baby Week Challenge Cup, exhibitions were held in 22 districts throughout Bengal, and it is calculated that the area covered included some 3,000 villages. The organisers report that the response from the people is most encouraging, and there is no doubt that repeated annual efforts, such as this, do much to combat the prevailing ignorance on health matters. All this work is done by volunteers, which makes it all the more remarkable and the more suitable for adoption elsewhere.

Enrolment of Registered Nurses and Voluntary Aid Detachments.—A scheme for the enrolment of registered nurses for emergency or war service to be operated by this Society in co-operation with the Trained Nurses' Association of India, was approved by the Managing Body.

The voluntary aid detachment scheme to provide volunteer nurses for military hospitals in case of war is now in operation.

Rural Welfare.—Slow but steady progress is being made with the scheme to open Red Cross sub-branches in smaller centres away from district headquarters. The Central Provinces and Berar branch towards the end of the year received Rs. 5,000 from the Government for village welfare work. Kotah State opened a number of Red Cross dispensaries in villages. Hyderabad has opened an experimental village centre for child welfare work, while the Central India branch reports that considerable propaganda work was carried out at fairs in villages.

The St. John Ambulance Association (Indian Council) and St. John Ambulance Brigade Overseas.*

209. During the year 1934 both branches of the Order, the Association with its instructional work, and the Brigade with its divisions of trained personnel, have shown progress, although financial difficulties continued to be a source of anxiety.

Altogether 27,821 persons attended 1,801 courses of instruction in first-aid, home nursing, home hygiene and sanitation, of whom 17,722 qualified

* Prepared from a note supplied by Miss Norah Hill, Secretary, Indian Red Cross Society.

for the Association's certificates, namely, 16,260 in first aid, 910 in home nursing, 450 in hygiene and 102 in sanitation . These figures show a striking increase over those for 1933, when 12,869 passed in first-aid and 584 in home nursing. This year, 420 persons obtained the voucher certificate by passing a second higher test in first-aid, while 154 qualified for the medallion by passing an examination for the third time. The new course, "Domestic Hygiene and Mothercraft," introduced in 1932, attracted 8 classes with 147 candidates of whom 114 qualified for certificates. The Mackenzie School course has continued to grow in popularity. In this course 9,596 students were instructed, of whom 6,788 were awarded certificates as compared with 6,268 in 1933.

The figures for first-aid show an increase of about 27 per cent over 1933 and those for home nursing almost a hundred per cent increase, which is a happy augury for the formation of the Nursing Division of the Brigade, and in turn for the formation of voluntary aid detachments, to which a reference is made in a subsequent paragraph. The number of first aid certificates issued is the largest ever issued in one year in India, even including the war years.

In addition to the above, 1,100 members of the criminal tribes settlements in the Punjab passed in the examination in first-aid (967) and home nursing (173), for whom certificates were not applied for as they could not afford to pay the fee.

From the St, John Ambulance Stores Depot, 20,876 text books were sold, an increase of 5,375 over the 1933 figure.

The two first-aid road stations in Calcutta continued to do useful work. In all 818 cases were dealt with of which 619 were treated on the spot and 144 were sent to hospital.

The All-India Ambulance Competitions were held in Calcutta from the 15th to 17th January, 1934, through the courtesy of the Bengal provincial centres. Eleven trophies were keenly contested by 65 teams, and 23 ladies entered for the individual competition. The largest number of teams entered for the boy scouts' trophy (13) and the trophies open to teams from Ambulance divisions of the St. John Ambulance Brigade Overseas and from educational institutions attracted 9 teams each.

St. John Ambulance Brigade Over-seas (Empire of India). In the Bihar earthquake the St. John Ambulance Brigade performed admirable work in assisting the sick and the injured. In co-operation with the Bengal provincial branch of the Indian Red Cross Society, a camp hospital fully equipped with tents, doctors, nurses, medicines ambulance workers, etc., was mobilized and despatched to Monghyr, the worst affected area. This was one of the first relief units to appear upon the scene, and its work was much appreciated.

The total number of Divisions rose from 72 to 86, the new formations being 2 Nursing and 1 Cadet Nursing Divisions in No. 1 District (Lahore), 4 Ambulance Divisions in No. II District (Calcutta), 3 Ambulance Divisions at Bangalore (South India) and 4 Cadet Ambulance Divisions in the United Provinces. In addition to the four existing Districts with headquarters at Lahore, Calcutta, Bombay and Madras a new District was formed in Mysore State with headquarters at Bangalore. This is the first unit of the Brigade Overseas in an Indian State, and it is hoped that other States will follow suit. Another important event has been the resuscitation of the Brigade in Burma where activities lapsed after the Great War.

British Empire Leprosy Relief Association (Indian Council).*

210. The British Empire Leprosy Relief Association continued to carry on activities along the prescribed lines which comprised research work, propaganda and publicity and training of doctors conducted directly under the headquarters organisation, and survey and treatment of lepers conducted by the provincial branches of the Association. The work under all these heads is gradually increasing in extent and intensity, and, encouraged by the good results of modern methods of treatment, leprous patients are seeking treatment in ever-increasing numbers. This is leading to an awakening of interest in all directions, and public bodies such as district boards and municipalities are becoming more and more alert in tackling the problem of leprosy in all its aspects. The result is that today there is available a wider data as regards the incidence and endemicity of leprosy, increased means of rendering proper treatment to the leper, an effective publicity organisation and a channel of educational propaganda to dispel ignorance about the disease and to bring the leper within the ambit of medical and public health activities of the country.

All these achievements have, however, only succeeded in bringing to notice the enormity of the leprosy problem and the complications with which it is hedged in all directions. The resources at the disposal of the British Empire Leprosy Relief Association are too meagre to enable it to attempt to do all that is desired and activities have necessarily to be confined to items of relative urgency

During the year 1934, the Endowment Fund of Rs. 22,32,760 yielded a revenue of Rs. 1,13,985 and the total expenditure amounted to Rs. 1,12,461. The details of work done were published in the Annual Report of the Association for that year, but the following expenditure incurred at headquarters on the various items of its programme gives an index to the amount of work done :—

	Rs.
Propaganda and publicity	16,174
Research	28,515
Training of doctors	2,306
Grants to provincial branches	57,450

Research work is carried on in Calcutta at the School of Tropical Medicine in co-operation with the Indian Research Fund Association, where a clinic is also maintained to provide material for research work and instruction. The work done in 1934 included pathology, bacteriology, rat leprosy and chemistry . In addition to this, field work has been undertaken over a fairly extensive area.

The 17 provincial and State branches are endeavouring to push the campaign of anti-leprosy work within their areas with greater vigour commensurate with their financial resources. Reports bear witness to the fact that the benefits are penetrating slowly and steadily through the barriers which at one time had appeared almost impregnable. The following excerpts from the Annual Report of the Association for 1934 are quoted as indicating the position reached towards the control of the disease :—

" The report received from Bihar and Orissa shows that Government, Mission to Lepers, interested Local Bodies and the British Empire Leprosy Relief Association are all working in co-operation for the benefit of the leper. Surveys have been held, dietic experiments made and a large number of patients have been treated. Burma Branch reports

* Prepared from a note supplied by the Secretary, B. E. L. R. A. (Indian Council).

that intensive local surveys have revealed twelve times more lepers (somewhere 16 and 21 times) than in the Census of 1931. Madras is going ahead with its ever-increasing number of clinics and the formation of District Leprosy Councils. The Rural Investigation Centre at Bankura in Bengal of which detailed reference is made in the report of that Province is fully justifying its purpose. A systematic survey of 150 villages was conducted which has clarified the situation with regard to the disease in the District. Some of the results namely, that more than 78 per cent of villages are affected and one in every six families harbours leprosy cases, and that on an average two out of every five cases are infectious are remarkable. These investigations are leading more and more to the conclusion that leprosy cannot be controlled by treatment alone. Treatment is necessary, and a large proportion of cases may be expected to recover, but infectious cases during the many years that they are under treatment may continue to infect the younger generation, unless they be effectively isolated.

In the Asansol area a Central Leprosy Board was formed in 1932, and later twelve divisional branches were formed scattered over an area about 250 square miles. Attempts are being made to isolate infectious cases outside the villages, one small village segregation camp having been opened in 1932, and another in 1934. In order to help to finance the work of the Asansol Leprosy Board, a Leper Day was organised on which, chiefly by the sale of flags, a sum of over Rs. 6,000 was raised.

The above results are reassuring to the Governing Body after ten years' work but the most gratifying feature of the provincial reports is the reports of returns from hospitals and clinics about the patients treated. Such remarks as patients discharged " cured ", " non-infectious ", " disease arrested," " apparently cured ", "decidedly improved," " complete disappearance " " symptom free " are now becoming quite common and when it is remembered that thousands of lepers are now under proper treatment and that one " cured " or " improved " case brings within the purview of the treatment centres more than a hundred lepers, the achievements of the past ten years can be better appreciated ".

The Countess of Dufferin's Fund and Women's Medical Service.

211. The main source of income of this Fund is the interest on its investments which amounted to Rs. 7·18 lakhs (cost price) on the 1st January, 1934. The Government of India grant was continued at the reduced rate of Rs. 3,44,300.

As usual, grants were given to provincial Dufferin branches and to various hospitals and other institutions. Of the scholarships, 18 were given to students in the Lady Hardinge Medical College, Delhi ; and 3 each in Bombay, Madras and Calcutta ; of these 18 were awarded from the Association's funds and the others from trust funds administered by the Dufferin Council.

The cadre of the Women's Medical Service consists of 41 officers excluding 8 temporary members and a training reserve of 11 officers.

Dr. Ruth Young remained on a study tour in China, America and Canada for six months as a guest of the Rockefeller Foundation of U. S. A., America.

Lady Minto's Indian Nursing Association.

212. The income of this Association is made up of an annual Government subsidy of Rs. 32,500, of interest on invested funds, Rs. 25,966 donations fees, subscriptions, etc. Rs. 1,47,846.

The nursing staff is composed of highly qualified European nursing sisters possessing maternity qualifications. They are recruited, under a 5 or 3 years agreement, for the most part in the United Kingdom by the selection committee of the home branch.

The following nursing homes and hospitals are staffed by nursing sisters of this Association :—

1. The Walker Hospital, Simla ; (2) the Ripon Hospital, Simla ; (3) Hindu Rao Hospital, Delhi ; (4) the Goergina McRobert Hospital, Cawnpore ; (5)

Portmore nursing home, Simla; (6) the Kashmir nursing home, Srinagar; (7) the railway hospital, Ajmer; (8) the Lady Willingdon nursing home, New Delhi; and (9) the Murree Nursing home, Murree.

During the year, the nursing sisters attended 2,967 cases, including 1,437 medical, 1,066 surgical, 281 infectious, 7 mental, 12 massage and 164 maternity cases.

The Bombay Presidency Baby and Health Week Association.

213. This Association with a relatively small income of Rs. 13,545, including a Government grant of Rs. 4,962, continued its health propaganda activities by issuing on loan cinema films or lantern slides, by arranging health lectures, demonstrations and exhibitions and by distributing leaflets, posters, etc.; but the most notable feature of this years activities was the incorporation of food and vitamins section in the health and child welfare exhibitions organised by this Association. A set of 36 magic lantern slides on food and health with key lectures was prepared. An experiment to improve the diet has been carried out at Matunga, Bombay, with the object of keeping the food cost per month per person at about Rs. 4 and to introduce nutritious but cheap food, such as dried skim milk, soya beans, riccpolishings etc., for balancing the defects in the present day diet of the poor and to observe their effects on the growth and health of children. The results show that the growth rate has been stimulated by nearly 6 per cent. in the case of some children and 3 per cent. in others. A pamphlet giving a general idea of balanced diets and the modifications that might be made in them so as to suit one's purse and taste was issued. A study of the height and weight of nearly 1,000 children in primary schools in Bombay city was also made to examine the state of nutrition among them. It was found that their growth was about 22 per cent. below the Indian standard and 12 per cent. below that of the orphans in the Byramjee Jeejeebhoy home of the Society for the promotion of children in Western India.

With a special grant of Rs. 3,000 from the Government of Bombay for rural health work, the cinema unit of the Association worked mainly for village propaganda in close cooperation with rural uplift district and *taluka* committees. A set of 31 new models was prepared specially for rural uplift work and included those on infant welfare and on cholera, guineaworm, smallpox and other common diseases in rural areas.

SECTION XII.

MISCELLANEOUS.

The New Constitution.

214. In view of the approach of the New Constitution it may be useful to review the future position of the Central Government *vis-a-vis* the autonomous provincial Governments in regard to public health. The Government of India Bill, published in February 1935 and since passed into law, gives three lists of subjects for legislation: List I is a Federal Legislative List, List II a Provincial Legislative List, and List III a Concurrent Legislative List. The Federal Legislature alone has power to make laws with respect to any matters in the Federal Legislative List. These include the health of cantonments; central institutes for medical and public health research and technical training in these subjects; the census; emigration and immigration and presumably supervision over the health of emigrants and immigrants as well as the health conditions under which pilgrims proceed to places beyond India; port quarantine, seamen's and marine hospitals and hospitals connected with port quarantine; federal and minor railways in respect of the safety of passengers and the general carriage of passengers in the latter; the declaration and delimitation of major ports and the constitution and powers of Port Authorities therein; aircraft and air navigation and the regulation and organisation of air traffic and of aerodromes in regard to health and quarantine; the carriage of passengers and goods both by sea and by air; the regulation of conditions of labour and safety in mines and oil fields; and migration within India from or into a Governor's province or a Chief Commissioner's province.

The Provincial Legislative List includes health conditions in prisons and allied institutions; local government in relation to health, including sanitation, hospitalisation and registration of births and deaths; pilgrimages within India; water supplies; the control of food and drugs, subject to certain restrictions mentioned later on in regard to the latter.

The Concurrent List gives subjects in regard to which both the Federal Legislature and a Provincial Legislature have power to make laws. The list is in two parts. Part I includes the medical and health aspects of such questions as marriage; the care of infants, minors and the mentally deficient; poisons and dangerous drugs. In Part II of the list are included various important subjects from the point of view of public health, such as factories; the welfare of labour; shipping and navigation; the carriage of passengers and goods on inland waterways; and notably, the prevention of the extension from one unit to another of infectious and contagious diseases. The power of calling for statistics on any subject in this part of the list is also of importance. A clear distinction exists between Parts I and II of this list. In regard to subjects in Part I, the federal entry is in effect confined to legislation, since the executive authority lies with the provinces. Central legislation, however, on subjects in Part II may authorise the giving of directions to a province by the Central Government as to the carrying out of such legislation, and if so, the Central Executive authority will then extend to the giving of such directions to the Province.

A section of the Act which may be of importance in future years is Section 135 which permits the establishment of Inter-provincial Councils, with such duties as investigation and discussion of subjects in which some or all provinces or the federation and one or more provinces have a common interest. The order establishing such a Council may make provision for representatives of Indian States to participate in its work.

It will thus be seen that a considerable measure of control is given to the Federal Government in regard to medical and public health matters which affect the country as a whole or certain classes of the population requiring special treatment. It is desirable and indeed necessary that in a Federation the Central Government should retain a considerable measure of general control over health conditions in the component parts of its territory, while leaving local Governments free of interference in matters which they are best qualified, through local knowledge and sentiment, to develop. Only by mutual assistance and goodwill between the Federal and local Governments can the desired objective be achieved in the establishment of a national health organisation built up with the assent of the people.

Food and Drugs.

215. The adulteration of foods will be a provincial subject under the New Constitution, whereas the control of poisons and dangerous drugs, excluding opium which is federal, come under the Concurrent List, other drugs being controlled by provincial Governments. There will therefore be power vested in the Central Government to control by an all-India standard, the use and abuse of poisons and dangerous drugs, but it should be emphasised that there is great need for uniform standards for many of the food-stuffs consumed in India. Not only is it desirable from the public health point of view that the provinces should adopt uniform standards for foodstuffs, but, if standards vary as between the provinces, there must inevitably be interference with commerce and with the transport of food materials from place to place. It is to be hoped that provincial Governments will realise this and that the various parts of India will reach an agreement on common food standards for the whole of the country. For example, with a substance like *ghee*, it is very desirable that an all-India standard be prescribed so that *ghee* which is frequently transported from province to province, may not be a different substance legally in the various parts of India. The same argument applies with force to milk and other milk products. In regard to the control of food and drugs, practice varies in the different provinces. In some the Acts apply both to food and drugs, in others there is separate legislation dealing with each. Under most Acts Public Analysts have been appointed and laboratories for examination and analysis established, but up to date the control of food adulteration is highly defective in most provinces, the legislation in many places being to all intents and purposes a dead letter. It is to be hoped that, when a Central Board of Health is established, the question of the control of food and drugs throughout India will be one of the first subjects to be taken up. In regard to drugs, the report of the Drugs Enquiry Committee published in 1931 has proposed a detailed policy which, if followed out by the Central and Local Governments, should result in a satisfactory measure of control. A similar policy for foodstuffs is urgently required. In regard to certain therapeutic substances, the League of Nations Permanent Commission on Biological Standardisation has been at work and has prescribed 26 international standards for a series of products, the assay of which can only be effected by biological methods. It is desirable that the same standards be adopted in India and Government has under consideration the maintenance of these biological standards at Central laboratories for the use of manufacturing and other concerns.

Central Malaria Organization.

216. Malaria is the disease in India which causes the greatest mortality, morbidity and economic loss. The Indian Research Fund Association, an

organization financed almost entirely by the Government of India, has established the Malaria Survey of India whose functions are :—to collect information on malaria ; to advise Government on all aspects of the disease in India ; to initiate enquiries for the Central Government and to assist local Governments in carrying out investigations ; to undertake systematic research in malaria, including clinical research into treatment ; to train officers in malaria work ; to publish the results of work done and to carry out *anti*-malaria propaganda. Altogether over 15 lakhs of rupees have hitherto been spent by the I. R. F. A. on this organization. During the nine years of its life the Malaria Survey of India has carried out invaluable work in all the directions indicated above and the time has come when its re-organization on a permanent basis should be considered. Many of the provinces now have their own Malaria Bureaux, but the Government of India has none. Since the primary function of the I. R. F. A. is to carry out research work, it is desirable that those activities of the Malaria Survey, not directly connected with research, should be taken over by the Central Government as its Malaria Bureau and placed on a permanent footing. Research work would then be carried out in close association with such a permanent Bureau but continue to be financed by the I. R. F. A. The Government of India would in this way have at its disposal a valuable organization to advise on and to carry out *anti*-malarial measures in the centrally administered areas and to assist provinces, while the I. R. F. A. would be free to concentrate upon research work with the help of the staff of the Central Bureau.

Aerial Navigation and Yellow Fever.

217. For many years the threat of the introduction of yellow fever into India lay in the danger of the arrival of infected persons or mosquitoes by ships. Recently, however, as a result of the establishment of rapid aerial communication between Africa and India, the danger has become acute and the main threat to India lies now in the introduction of infection, by persons or mosquitoes, by way of air traffic. Africa, the main endemic home of yellow fever, is now only a few days distant in time from India, and an infected person embarking on a plane in Africa could arrive in India in the infective stage of the disease. When the International Aerial Navigation Convention, 1933, was drawn up, the possibilities of infection in Africa were only visualised in the endemic home of yellow fever in the western part of the tropical belt of that continent. Since then the existence of 'silent' areas has been discovered in which, by mouse protection tests, it has been demonstrated that yellow fever has existed within the life time of the present generation. The demonstration of these areas has widely extended the territory in Africa in which potential sources of infection exist and, since the International Convention does not recognise such areas as infected, inadequate precautions exist in these areas for the prevention of the spread of infection from them. At the Conference of Medical Research Workers held this year the following resolution was passed :—

"In light of the recent developments in connection with yellow fever in Africa including the occurrence of suspected cases of the disease in areas where positive mouse-protection tests had been obtained although no clinical cases had previously been recognised, this Conference views with concern the opinion expressed by the Yellow Fever Commission of the Office International at its May 1934 session that the establishment of *anti*-amaryl aerodromes and the application of the other requirements of Section II of the Aerial Sanitary Convention are not obligatory in regions where the only information available is that of positive mouse-protection tests.

"In the absence of exact knowledge of the epidemiological significance of the so-called "silent areas" and the potentialities which these areas may possess for the

dissemination of yellow fever, this Conference considers that the approval given by the Yellow Fever Commission of the Office International to the exemption of such areas from the application of the provisions of Article 38, Chapter II of the Aerial Sanitary Convention entails a weakening of the chain of preventive measures. This Conference further expresses the opinion that such areas should be considered as definite yellow fever areas for the purpose of the application of the provisions of the Convention and that the full requirements of the Aerial Sanitary Convention (Chapter II, Section II) should be made immediately applicable to them.

"This Conference is of opinion that the Government of India should take drastic precautions against air traffic coming from the "silent area" where the administrative authorities of these areas have not established *anti*-amaryl aerodromes."

Until such time as the degree and extent of infection in such "silent areas" are ascertained and the limit of these areas demarcated, it is only prudent for India to regard them as potential sources of infection and to take steps accordingly.

Were yellow fever introduced into India, the disease would be so appalling that it might well cripple the country for a generation. All the necessary factors for the rapid spread of the disease, if the virus be introduced, are present, and it is necessary that we should realise the risk and be prepared. Precautionary measures consist in freeing our cities, and particularly our seaboard towns, of the stegomyia mosquito and in establishing adequate quarantine facilities for isolation of suspected cases and their contacts in mosquito-proof buildings at our airport of entry in Karachi.

Nutrition.

218. Whatever may be the solution of the population problem in India, no one will deny that our large annual increase of population requires that attention should be directed, to a greater extent than has hitherto been the case, to the important subject of nutrition. As has been mentioned in the introduction to this report, the whole question bristles with difficulties, the principal one being the lack of accurate data on food production. A great deal of research has been carried out in the Nutrition Research Laboratories of the I. R. F. A. at Coonoor and the results of this research require to be made known to the public. Over and above this there is need for an investigation into the state of nutrition and dietary habits of the people, on which our information is lamentably deficient. Only after ascertaining the facts will it be possible to draw up a sound scheme for the improvement of nutrition in the country. Such a survey cannot be carried out by the Central Government alone. It requires the active co-operation of all units, and it seems desirable that a beginning should be made by appointing, on the staff of the Directors of Public Health in each province, an officer who might be trained as a nutrition expert to carry out provincial surveys and to act as general nutrition adviser in his province.

Professor A. L. Bowley and Mr. D. H. Robertson in their report to the Government of India on "A scheme for an economic census of India with special reference to a census of production and reorganization of statistics" have recognised the inseparable connection between health and economic questions and the desirability of including information regarding health matters within the scope of the surveys they have proposed.

One of the greatest deficiencies in the diet of the peoples of India is the fat-soluble vitamin A. New cheap sources of this important vitamin are urgently needed and research on this subject should be prosecuted with vigour.

Rural Hygiene.

219. Sanitary improvements in rural areas, where the vast majority of the population of India live, is one of the outstanding needs of the country. In these areas, educationally, socially and materially backward as the people are compared with urban areas, general sanitation is still in a primitive condition. There are few protected water supplies or efficient arrangements for conservancy. There is much soil pollution, fly breeding is intense in most, malaria is rampant through great tracts, and epidemics find a favourable home and take a heavy toll of life annually. Medical relief for the most part is grossly inadequate, and maternity and child welfare works are almost completely lacking. It is perhaps natural that funds available for environmental hygiene have hitherto been spent mainly in the towns, but there is great need for improvement of sanitation in the villages and the claims of the rural dwellers should not continue to be neglected.

It is true that a beginning has been made in various areas. In Hlegu in Burma, the first rural health unit in India was established in 1929 in cooperation with the Rockefeller Foundation. Such units are of great value both as experimental stations for trying out schemes of village improvement, and as demonstration and educational centres. Every province in India should have such a station and the ideal should be to develop one in each district or division. There is a movement going on in India now for rural uplift and improvement. The establishment of rural health units should be an integral part of this movement. A good deal of preparatory work has already been done. Health instruction is being given in schools, but more is required in this direction. Educational propaganda is being fostered, but it requires to be based on a definite policy. The sections of District Board Acts dealing with health subjects are for the most part permissive and there is need for mandatory injunctions in regard to the more important subjects. Where powers are given, responsibility should also be accepted. Public health staff in rural areas is notably deficient and, in some provinces, heavily worked civil surgeons are still responsible, on paper, for the health of their districts. There are insufficient sanitary inspectors in many areas and health visitors, probably the most important unit of the lot, are almost entirely absent in rural areas.

Since the close of the year the Government of India have given grants to provinces for rural reconstruction approximating over 90 lakhs and have specified sanitary measures, such as *anti*-malarial schemes, village water supplies and village sanitation, among the principal subjects, to which the funds should be devoted. It is to be hoped that these substantial grants will accelerate the progress of rural sanitation and will assist and stimulate provinces to draw up a definite policy for effecting improvement in the health conditions of life of the Indian villager.

The Health Committee of the League of Nations have recently focussed attention on rural hygiene, and proposals have been made for holding a conference on the subject in the Far East. This should have an important effect in stimulating interest in the subject in this country, particularly if Governments sent strong delegations to attend it. The experience gained at such a conference, where the methods of rural hygiene adopted in other countries having problems similar to those of India will be discussed, should be invaluable.

Conclusion.

220. In the last two reports reference has been made to the effects of retrenchment on public health budgets throughout the country. The result

of such retrenchments, necessitated no doubt by financial stringency, on the activities of Public Health Departments has been serious. There are signs, however of financial improvement and it is to be hoped that with such improvement there will be a resumption of that development of public health activities which has been a feature since the introduction of the Reforms.

In Table XII (*i*) below are set out the figures of expenditure by provincial Public Health Departments for the years immediately preceding and following the financial crisis. The only province showing an increase is the N.-W. F. Province and here the circumstances are unique in that this area was formed into a Governor's province in 1932. The reductions of expenditure on public health in other provinces must have seriously curtailed the activities of the Public Health Departments.

TABLE XII (*i*).

	1930-31.	1932-33.	Per cent. decrease —or increase. +.
	Rs.	Rs.	
Total	**1,78,07,763**	**1,39,40,252**	**—22**
N.-W. F. P.	94,603	1,21,106	+28
Punjab	19,48,116	12,12,483	—38
U. P.	23,49,781	18,65,285	—20
B. & O.	11,45,527	4,53,113	—60
Bengal	37,27,339	36,84,112	—1
C. P.	5,44,000	3,57,000	—34
Bombay	26,65,838	23,82,237	—11
Madras	34,23,416	22,69,387	—34
Assam	7,61,091	6,06,719	—20
Burma	11,48,052	9,88,810	—14

Table XII (*ii*) below shows the number of districts in each province employing full time medical officers of health and the number without such officers.

TABLE XII (*ii*).

	No. of districts.	Those employing M. O. Hs.	Number without M. O. Hs.
N.-W. F. P.	5	..	5
Punjab	29	28	1
U. P.	48	30	18
B. & O.	21	12	9
Bengal	26	26	..
C. P.	19	..	19
Bombay	28	4	24
Madras	25	25	..
Coorg	1	..	1
Assam	13	..	13
Burma	33	3	30
Ajmer-Merwara	1	..	1

It is evident that the development of district health services is very backward in the Central Provinces, Bombay, the N.-W .F. Province and Burma. In the last mentioned province, however, a strong cadre of epidemic sub-assistant surgeons, normally employed in districts, makes the position less serious than it appears in the table.

Now that the Niemeyer Committee appointed by His Majesty's Government to review the budgetary positions of the Government of India and provincial Governments on the matters referred to in Sections 138 (1) and (2), 140 (2) and 142 of the Government of India Act, 1935, has made recommendations on the percentage contributions, which the Government of India under the Federal Constitution should give to enable local Governments to meet their increased responsibilities, it is hoped that the claims of the Public Health Departments for development and expansion will not be overlooked. The Committee have stated on pages 3-4 of their report:

"Expenditure in the Provinces could obviously be increased, with advantage, on many heads. This is a question of degree and opportunity. Some expansion in fact took place even with existing provincial resources, especially in the years before the slump when many provinces were able, for instance, to increase substantially their expenditure on education, agriculture, medical and public health. And some expansion may now be anticipated from the recovery of provincial revenues, not all of which are or need be static. Nevertheless, the allocation at an early date of a share in Taxes and Income under Section 138 of the Government of India Act constitutes for many provinces the main hope for future expansion."

There are signs on all hands that the "sanitary idea" is beginning to penetrate the mind of India. The intensive public health propaganda carried out in most provinces during the last ten or twelve years is beginning to bear fruit: interest is increasing in such matters as rural reconstruction, nutrition, child welfare and the prevention of epidemics. This is the most welcome feature in the present situation. Public health cannot proceed much in advance of education, but it must be remembered that the best form of public education is the efficient administration of the public health services. The time is ripe for a big step forward and it appears that public opinion is now ready to accept more specific and more mandatory public health legislation. In 1866 Sir John Simon, the first Chief Medical Officer of the English Local Government Board, wrote: "The grammar of sanitary legislation, with few exceptions, has not yet acquired the imperative mood." This is the present position in India and there is little doubt but that much more of the 'imperative' could now be introduced into our various Public Health Acts. For example, compulsory vaccination is capable of extension to the greater part of our rural areas.

In the words of Disraeli: "Power has only one duty, to secure the social welfare of the people."

G. G. JOLLY, *Lieut.-Col., I.M.S.,*
Offg. Public Health Commissioner with the Government of India.

SIMLA;
The 10th July, 1936.

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Appendix I

relating to

Section I.

TABLE A.—MAXIMUM, MINIMUM AND MEAN TEMPERATURE AND DEPARTURE FROM THE AVERAGE OF THE MEAN TEMPERATURE AT 32 STATIONS, AND RAINFALL WITH ITS DEPARTURE AT 33 STATIONS IN INDIA DURING 1934.

Station.	January.						February.						March.					
	Max.	Min.	Mean temp.	Dep.	Rain.	Dep.	Max.	Min.	Mean temp.	Dep.	Rain.	Dep.	Max.	Min.	Mean temp.	Dep.	Rain.	Dep.
Rangoon	89·8	67·6	78·7	+1·9	...	—0·21	91·1	67·7	79·4	+0·4	1·11	+0·89	95·1	71·1	83·1	—0·5	...	—0·32
Akyab	80·8	57·6	69·2	—0·9	...	—0·06	82·6	61·0	71·8	—0·9	...	—0·15	88·1	67·7	77·9	—0·6	...	—0·49
Sibsagar	73·4	51·0	62·2	+2·3	1·50	+0·21	74·0	54·1	64·1	+1·1	2·76	+0·75	83·1	59·4	71·3	+2·1	0·92	—3·86
Silchar	77·7	50·8	64·3	—0·9	0·19	—0·62	80·6	56·0	68·3	+0·2	4·74	+2·62	87·0	62·7	74·9	+0·3	3·57	—4·34
Chittagong	80·3	53·7	67·0	+0·2	0·12	—0·16	82·3	59·2	70·7	+0·3	0·49	—0·54	88·0	67·7	77·9	+0·8	1·00	—1·56
Narayanganj	78·3	55·0	66·7	+0·1	0·40	+0·10	81·8	59·3	70·5	+0·3	2·89	+1·49	93·1	68·5	80·8	+2·1	...	—2·69
Calcutta	77·6	55·5	66·5	...	...	—0·34	83·1	61·6	72·3	+1·1	0·08	—1·02	94·4	70·5	82·5	+2·3	0·16	—1·28
Cuttack	83·9	56·5	70·2	—1·5	...	—0·27	89·7	61·3	75·5	—1·5	0·44	—0·32	98·4	70·4	84·4	—0·1	0·06	—1·05
Hazaribagh	71·6	48·2	59·9	—2·1	1·91	+1·19	77·4	52·9	65·1	—0·7	0·26	—0·87	87·2	62·2	74·7	—1·0	0·18	—0·86
Patna	72·9	51·3	62·1	+0·3	1·37	+0·84	77·5	56·7	67·1	+1·3	0·09	—0·62	89·7	64·5	77·1	+0·4	0·19	—0·28
Allahabad	75·8	47·8	61·8	+0·6	0·86	+0·10	82·0	53·0	67·5	+1·8	...	—0·58	90·0	62·3	76·1	—0·7	0·83	+0·52
Lucknow	73·4	46·6	60·0	—0·3	1·71	+0·94	80·5	52·9	66·7	+2·0	...	—0·65	89·0	60·8	74·9	—0·5	0·84	+0·49
Jhansi	75·5	47·3	61·4	—2·1	0·28	—0·31	84·5	52·7	68·6	+0·7	...	—0·45	89·2	61·6	75·4	—3·5	0·99	+0·70
Agra	70·1	42·1	56·1	—2·9	0·63	+0·09	81·0	47·4	64·2	+1·5	...	—0·48	85·5	55·0	70·3	—2·7	0·83	+0·48
Meerut(*)	...	...	...	...	1·23	—0·05	...	...	...	...	...	—0·88	...	...	...	...	1·69	+1·07
Delhi	66·9	43·2	55·1	...	1·30	+0·26	78·1	50·7	64·4	...	...	—0·76	83·2	57·5	70·3	...	2·40	+1·88
Lahore	64·4	37·5	50·9	—3·6	0·53	—0·52	77·7	48·3	63·0	+4·9	0·16	—0·78	80·4	54·5	67·5	—0·4	1·13	+0·27
Multan	66·0	38·5	52·3	—4·6	0·01	—0·41	81·8	51·3	66·5	+5·6	...	—0·36	83·7	57·7	70·7	—1·3	0·43	...
Peshawar	61·1	35·3	48·2	—3·9	0·30	—1·26	75·7	47·6	61·7	+6·7	0·15	—1·20	74·5	52·1	63·3	...	5·57	+3·32
Manora (Karachi)	72·0	52·2	62·1	—4·5	...	—0·52	77·0	61·6	69·3	+0·3	...	—0·39	80·9	67·8	74·3	—0·9	0·08	—0·25
Ajmer	69·4	41·9	55·7	—4·0	0·17	—0·19	83·1	49·8	66·5	+2·9	...	—0·25	85·5	58·8	72·1	—2·1	0·12	—0·07
Deesa	81·1	45·9	63·5	—3·9	...	—0·11	94·1	53·7	73·9	+3·5	...	—0·16	96·2	61·1	78·7	—0·8	0·16	+0·08
Indore	76·7	47·0	61·9	—3·0	0·20	—0·08	86·6	52·3	69·5	+1·8	...	—0·18	90·9	59·2	75·1	—1·3	...	—0·06
Saugor	74·4	50·7	62·5	—2·1	0·51	—0·08	83·8	57·3	70·5	+2·5	...	—0·44	88·8	64·2	76·5	—1·3	0·33	—0·02
Jubbulpore	76·6	46·3	61·5	...	0·21	—0·59	84·3	47·6	66·1	...	...	—0·82	91·0	57·0	74·0	...	0·75	+0·18
Nagpur	81·0	52·3	66·7	—2·9	0·03	—0·39	91·7	55·8	73·7	—0·3	...	—0·60	97·8	65·5	81·7	—0·7	...	—0·52
Bombay	81·9	64·1	73·0	—1·8	...	—0·10	85·6	68·0	76·8	+1·7	...	—0·08	85·6	71·8	78·7	...	0·04	—0·03
Belgaum	83·5	58·0	70·7	+0·1	0·13	...	89·4	59·7	74·5	+0·7	...	—0·05	93·5	61·9	77·7	—1·0	...	—0·27
Bangalore	80·5	60·2	70·3	+1·2	0·29	+0·03	87·3	58·9	73·1	—0·1	...	—0·17	91·2	64·5	77·9	—0·1	0·30	—0·20
Madras	82·4	70·3	76·3	+0·1	2·05	+0·66	85·2	66·5	75·9	—1·7	...	—0·32	88·5	71·5	80·0	—0·6	...	—0·19
Bellary	85·7	63·8	74·7	—0·2	...	—0·11	92·1	65·0	78·5	—1·5	...	—0·16	97·3	72·3	84·8	—1·5	...	—0·20
Darjeeling	45·6	33·5	39·5	—1·7	0·31	—0·24	48·9	36·9	42·9	+0·4	2·76	+1·66	56·0	43·0	49·5	+0·1	0·12	—1·72
Mussooree	44·5	32·8	38·7	—4·1	2·55	...	55·7	42·7	49·2	+5·3	0·20	...	58·8	43·7	51·3	—1·6	3·38	...

(*) Reports only rainfall.

TABLE A.—MAXIMUM, MINIMUM AND MEAN TEMPERATURE AND DEPARTUE FROM THE AVERAGE OF THE MEAN TEMPERATURE AT 32 STATIONS, AND RAINFALL WITH ITS DEPARTURE AT 33 STATIONS IN INDIA DURING 1934—*contd.*

Station.	April.						May.						June.					
	Max.	Min.	Mean temp.	Dep.	Rain.	Dep.	Max.	Min.	Mean temp.	Dep.	Rain.	Dep.	Max.	Min.	Mean temp.	Dep.	Rain.	Dep.
Rangoon	93·4	74·8	84·1	—2·9	18·97	+17·34	94·8	77·1	85·9	+1·5	4·73	—7·25	87·2	75·8	81·5	+0·1	14·68	—3·36
Akyab	89·5	75·9	82·7	—0·6	0·58	—1·49	91·0	78·0	84·5	+0·4	5·83	—8·12	84·9	76·6	80·7	—1·0	33·55	—13·39
Sibsagar	82·1	67·0	74·5	+1·0	15·33	+5·22	83·6	70·5	77·1	—1·4	11·57	—0·32	85·0	74·1	79·5	—2·9	21·78	+7·57
Silchar	87·2	69·1	78·1	—0·1	26·73	+12·40	86·3	70·0	78·1	—2·5	29·71	+14·12	86·7	74·5	80·6	—2·1	32·77	+11·09
Chittagong	88·5	74·1	81·3	+0·5	2·78	—2·69	89·2	75·3	82·3	+0·1	8·76	—0·76	86·2	76·1	81·1	—0·7	25·28	+4·49
Narayanganj	93·1	74·9	84·0	+1·0	3·60	—1·88	91·3	75·1	83·2	—0·3	9·25	—0·16	89·0	77·3	83·1	—0·3	22·63	+9·68
Calcutta	96·4	77·7	87·1	+1·5	1·95	+0·06	96·9	79·6	88·3	+2·1	2·55	—3·20	92·1	79·5	85·8	+0·7	7·69	—4·21
Cuttack	102·7	78·7	90·7	+1·2	...	—1·15	106·4	81·3	93·9	+3·3	0·74	—3·21	94·9	79·0	86·9	—0·5	10·36	+0·28
Hazaribagh	98·4	70·6	84·5	—0·5	0·23	—0·26	103·7	76·1	89·9	+2·3	0·10	—2·21	94·6	75·1	84·9	+0·3	5·51	—3·62
Patna	100·9	74·4	87·7	+1·5	...	—0·30	103·5	79·5	91·5	+2·8	0·34	—1·33	96·5	79·6	88·1	+0·3	3·32	—4·80
Allahabad	103·5	72·1	87·8	+0·4	...	—0·15	109·1	80·1	94·6	+1·5	...	—0·34	103·1	82·6	92·9	+0·5	3·05	—1·91
Lucknow	103·2	70·8	87·0	+0·9	...	—0·26	108·2	78·6	93·4	+2·1	...	—1·01	102·0	80·7	91·3	—0·1	3·69	—0·78
Jhansi	102·7	72·1	87·4	—2·1	...	—0·15	108·0	79·5	93·7	—2·2	...	—0·38	102·3	82·2	92·3	—1·9	7·48	+3·18
Agra	100·8	65·6	83·2	—1·5	...	—0·24	106·1	75·9	91·0	—1·3	...	—0·47	101·7	81·1	91·4	—3·1	4·14	+1·79
Meerut(*)	...	...	...	...	...	—0·43	...	...	...	...	0·06	—0·59	...	...	...	...	3·15	+0·02
Delhi	97·8	67·8	82·8	...	...	—0·39	102·9	77·0	89·9	...	0·14	—0·44	100·8	81·2	91·0	...	2·51	—0·48
Lahore	95·2	64·4	79·8	+0·9	0·05	—0·49	101·4	72·2	86·8	—1·1	0·10	—0·60	105·5	80·1	92·8	+0·3	1·12	—0·56
Multan	99·1	69·9	84·5	+1·6	0·20	—0·07	104·6	76·1	90·3	—2·1	0·18	—0·17	109·4	84·0	96·7	+0·2	2·31	+1·69
Peshawar	86·9	61·5	74·2	+1·5	1·64	—0·21	92·0	68·8	80·4	—3·1	0·81	—0·01	104·4	79·8	92·1	+1·1	0·01	—0·35
Manora (Karachi)	86·8	74·9	80·9	+1·0	...	—0·17	89·1	79·6	84·3	+0·6	...	—0·07	89·9	81·4	85·7	—0·7	1·28	+0·42
Ajmer	97·4	68·4	82·9	—2·0	0·19	+0·02	101·3	79·2	90·3	—1·5	0·08	—0·52	99·6	80·4	90·0	—1·1	5·18	+2·77
Deesa	107·2	70·8	89·0	+1·5	...	—0·03	108·7	76·2	92·5	+0·3	...	—0·43	102·1	80·9	91·5	+0·1	5·52	+3·34
Indore	100·1	69·6	84·9	...	0·01	—0·13	102·5	76·3	89·4	—0·1	...	—0·58	97·3	76·8	87·1	+1·6	10·44	+4·74
Saugor	100·1	74·1	87·1	+0·4	...	—0·15	104·3	78·9	91·6	—0·3	...	—0·50	98·8	77·7	88·3	...	10·91	+4·44
Jubbulpore	102·1	67·2	84·7	...	...	—0·25	106·5	74·9	90·7	...	...	—0·53	98·7	78·6	88·7	...	16·50	+9·18
Nagpur	105·9	74·9	90·4	+0·1	1·23	+0·67	109·8	82·3	96·1	+0·9	...	—0·83	99·4	79·0	89·2	+0·3	7·18	—1·78
Bombay	90·1	77·4	83·7	+1·7	...	—0·05	91·6	79·5	85·5	+0·5	...	—0·84	88·9	78·1	83·5	+0·1	28·45	+10·14
Belgaum	95·6	67·2	81·4	—0·1	2·01	+0·41	95·8	67·8	81·8	+1·1	0·59	—1·87	82·4	68·7	75·5	+0·7	9·82	+1·68
Bangalore	93·9	69·7	81·8	+0·3	3·56	+2·23	93·5	70·2	81·9	+1·4	2·53	—1·83	85·9	67·7	76·8	+0·9	3·35	+0·46
Madras	92·1	77·6	84·9	+0·1	0·74	+0·21	97·8	81·7	89·7	+0·3	...	—1·07	97·4	80·3	88·9	—0·6	1·76	—0·18
Bellary	101·2	77·1	89·1	—1·3	0·89	+0·13	103·2	79·4	91·3	+1·3	0·52	—1·44	93·5	76·7	85·1	—0·3	1·70	—0·17
Darjeeling	63·0	50·1	56·5	+1·1	2·61	—1·24	62·0	51·8	56·9	—1·5	11·41	+2·71	64·5	55·3	59·9	—1·5	22·38	—1·88
Mussooree	71·0	54·7	62·9	+0·6	0·95	...	75·8	57·0	66·4	—1·6	1·53	...	73·7	60·8	67·3	—1·9	12·49	...

(*) Reports only rainfall.

TABLE A.—MAXIMUM, MINIMUM AND MEAN TEMPERATURE AND DEPARTURE FROM THE AVERAGE OF THE MEAN TEMPERATURE AT 32 STATIONS, AND RAINFALL WITH ITS DEPARTURE AT 33 STATIONS IN INDIA DURING 1934 – *contd.*

Station.	July.						August.						September.					
	Max.	Min.	Mean temp.	Dep.	Rain.	Dep.	Max.	Min.	Mean temp.	Dep.	Rain.	Dep.	Max.	Min.	Mean temp.	Dep.	Rain.	Dep.
Rangoon	86·5	75·4	80·9	+0·4	21·54	+0·12	85·8	74·9	80·3	—0·1	18·22	—1·65	86·6	75·7	81·1	+0·2	13·48	—1·79
Akyab	83·6	76·9	80·3	—0·5	37·57	—17·23	83·8	76·7	80·3	—0·5	29·23	—15·96	84·4	77·1	80·7	—1·1	32·92	+10·35
Sibsagar	89·7	77·8	83·7	+0·3	21·11	+4·10	90·5	77·6	84·1	+0·9	15·99	—0·28	89·5	76·7	83·1	+1·2	14·28	+2·58
Silchar	89·9	77·1	83·5	—0·1	26·97	+7·23	91·4	76·3	83·9	+0·7	20·30	+0·55	90·9	77·1	84·0	+1·0	15·50	+1·09
Chittagong	85·8	76·5	81·1	—0·1	41·81	+19·41	87·2	77·2	82·2	+1·1	16·75	—2·55	88·3	77·7	83·0	+1·4	3·33	—8·60
Narayanganj	88·8	79·0	83·9	+0·3	14·39	+1·41	89·0	78·9	83·9	+0·7	10·47	—2·27	90·5	79·8	85·1	+1·6	5·40	—4·23
Calcutta	90·1	79·5	84·8	+1·1	8·91	—3·60	89·0	78·7	83·9	+0·7	14·10	+1·41	89·2	79·3	84·3	+1·1	12·42	+2·55
Cuttack	89·5	78·4	83·9	—0·3	10·25	—1·46	88·2	77·5	82·9	—0·9	21·13	+7·47	89·5	77·9	83·7	—0·4	12·70	+3·13
Hazaribagh	85·7	74·2	79·9	+0·3	15·08	+2·64	84·6	73·6	79·1	+0·5	13·08	—0·06	85·3	73·1	79·2	+0·7	7·19	—1·99
Patna	91·7	80·5	86·1	+0·9	13·34	+1·40	89·9	80·7	85·3	+1·1	5·73	—7·82	90·5	80·4	85·5	+1·3	8·11	—0·22
Allahabad	92·1	79·7	85·9	—0·4	7·08	—4·63	89·8	78·9	84·3	+0·1	8·39	—3·31	90·4	78·3	84·3	+0·1	8·06	+2·39
Lucknow	91·9	79·5	85·7	—0·3	12·35	+0·90	90·8	78·2	84·5	—0·1	8·81	—2·08	92·0	77·0	84·5	+0·4	13·92	+6·85
Jhansi	91·2	77·6	84·4	—1·5	5·85	—5·72	88·8	76·5	82·7	—0·7	21·87	+10·62	89·5	75·8	82·7	—1·3	13·88	+7·96
Agra	93·7	79·5	86·6	—1·0	3·58	—5·54	88·3	77·8	83·1	—2·3	7·34	—0·81	91·6	74·9	83·3	—1·1	2·66	—1·39
Meerut (*)	...	...	...	...	7·91	—1·18	...	...	...	...	14·38	+5·69	...	...	...	...	3·33	—2·74
Delhi	94·3	80·4	87·3	...	13·13	+5·60	89·7	77·3	83·5	...	10·25	+2·83	95·4	75·8	85·6	...	0·05	—4·73
Lahore	99·5	81·8	90·7	+0·9	3·75	—1·73	95·3	78·8	87·1	—0·8	4·44	—0·89	100·7	75·4	88·1	+2·9	0·03	—2·33
Multan	103·6	83·7	93·7	—0·7	2·94	+0·92	103·7	83·5	93·6	+1·9	0·55	—1·43	103·3	...	...	...	...	—0·41
Peshawar	103·1	82·3	92·7	+1·7	0·02	—1·22	96·5	78·8	87·7	—0·7	0·16	—2·08	97·2	72·7	84·9	+1·9	0·72	—0·09
Manora (Karachi)	89·0	81·7	85·3	+0·6	6·49	+3·55	87·6	80·6	84·1	+2·1	0·23	—1·44	85·9	77·8	81·9	+0·7	...	—0·42
Ajmer	90·0	77·7	83·9	—1·1	4·38	—2·08	86·1	75·3	80·7	—1·3	15·49	+8·74	88·4	74·0	81·2	—1·2	2·65	—0·02
Deesa	92·0	77·2	84·6	—1·0	10·95	+1·95	88·1	76·2	82·1	—0·5	16·24	+7·62	93·0	73·0	83·0	—0·7	0·93	—2·61
Indore	84·3	72·5	78·4	—0·7	9·37	—0·50	81·4	71·9	76·7	—0·3	21·21	+13·20	81·8	70·2	76·0	—1·7	14·95	+8·42
Saugor	84·2	73·3	78·7	—1·3	17·51	+3·57	83·5	72·7	78·1	—0·1	29·06	+15·41	82·9	71·7	77·3	—1·7	24·52	+17·58
Jubbulpore	85·2	75·0	80·1	...	12·78	—4·84	85·0	74·2	79·6	...	15·20	—1·66	84·4	73·9	79·1	...	20·80	+13·13
Nagpur	87·1	74·7	80·9	—0·8	8·20	—5·64	85·6	73·7	79·7	—1·1	9·26	—2·38	85·5	73·1	79·3	—2·1	10·66	+2·41
Bombay	85·6	77·0	81·3	+0·3	21·37	—2·89	84·0	76·2	80·1	—0·3	14·07	+0·27	86·1	76·2	81·1	+0·7	5·88	—4·62
Belgaum	76·0	67·8	71·9	+0·3	18·91	+2·76	74·9	67·5	71·2	—0·1	11·02	+1·35	78·5	65·4	71·9	—0·5	1·67	—3·21
Bangalore	83·7	66·9	75·3	+1·2	1·32	—2·86	81·9	66·6	74·3	+0·3	2·65	—2·73	86·3	66·3	76·3	+2·3	0·33	—6·65
Madras	95·2	78·9	87·1	+0·1	2·07	—1·87	92·8	77·6	85·2	—0·3	7·17	+2·53	93·3	78·0	85·7	+1·0	2·00	—2·99
Bellary	88·9	74·4	81·7	—1·4	4·43	+2·58	87·5	74·3	80·9	—1·5	0·30	—2·02	90·4	73·6	82·0	+0·2	0·19	—4·89
Darjeeling	66·4	58·5	62·5	+0·1	22·69	—9·62	66·3	58·0	62·1	+0·1	24·32	—1·80	66·7	57·5	62·1	+1·5	11·59	—6·79
Mussooree	67·9	60·7	64·3	—1·7	18·04	...	67·2	59·4	63·3	—1·1	30·13	...	68·0	58·4	63·2	+0·5	8·44	...

(*) Reports only rainfall.

TABLE A.—MAXIMUM, MINIMUM AND MEAN TEMPERATURE AND DEPARTURE FROM THE AVERAGE OF THE MEAN TEMPERATURE AT 32 STATIONS, AND RAINFALL WITH ITS DEPARTURE AT 33 STATIONS IN INDIA DURING 1934—*concld.*

Station.	October.						November.						December.					
	Max.	Min.	Mean temp.	Dep.	Rain.	Dep.	Max.	Min.	Mean temp.	Dep.	Rain.	Dep.	Max.	Min.	Mean temp.	Dep.	Rain.	Dep.
Rangoon	89·0	75·7	82·3	+0·7	7·32	+0·41	89·5	71·4	80·5	+0·3	1·12	—1·67	86·7	62·8	74·7	—2·5	0·10	—0·27
Akyab	86·7	75·8	81·3	—0·5	21·20	+10·29	82·7	66·4	74·5	—3·3	7·94	+2·46	80·0	59·7	69·9	—2·1	0·02	—0·74
Sibsagar	85·0	70·1	77·5	+0·2	5·69	+0·59	77·2	61·9	69·5	+0·9	1·59	+0·49	74·5	50·0	62·3	+1·3	0·04	—0·48
Silchar	88·5	71·6	80·1	—0·4	6·36	—0·19	80·0	61·4	70·7	—3·5	7·11	+5·71	78·9	52·5	65·7	—1·5	0·18	—0·21
Chittagong	88·3	73·2	80·7	+0·7	11·79	+4·91	82·0	63·3	72·7	—1·7	4·55	+2·68	79·9	56·3	68·1	+0·3	0·33	—0·37
Narayanganj	89·3	75·3	82·3	+0·7	9·22	+4·15	82·7	65·8	74·3	—0·5	1·60	+0·62	79·7	58·4	69·1	+1·5	0·55	+0·36
Calcutta	88·0	75·4	81·7	—0·7	5·36	+1·17	82·0	64·3	73·1	—0·3	0·86	+0·20	77·9	58·8	68·3	+1·9	0·31	+0·11
Cuttack	89·7	73·4	81·5	—0·7	5·43	+0·23	85·4	62·9	74·1	—1·5	0·12	—1·41	83·3	59·3	71·3	+1·5	...	—0·28
Hazaribagh	82·5	63·6	73·1	—2·2	1·88	—1·29	77·2	54·7	65·9	—1·8	0·17	—0·20	73·1	49·4	61·3	—0·1	...	—0·21
Patna	88·4	72·3	80·3	—0·3	3·17	+0·63	81·2	60·1	70·7	—0·7	0·35	+0·07	76·4	55·1	65·7	+2·8	...	—0·09
Allahabad	91·5	65·6	78·5	—0·7	0·09	—2·23	83·4	56·9	70·1	+0·8	0·20	—0·13	76·7	51·5	64·1	+2·4	0·10	—0·13
Lucknow	93·4	63·9	78·7	—0·1	0·39	—0·79	85·1	54·5	69·8	+1·2	...	—0·19	77·5	50·5	64·0	+2·9	0·50	+0·22
Jhansi	91·9	62·8	77·3	—3·9	...	—0·87	84·7	54·9	69·8	—2·2	...	—0·17	76·9	50·6	63·7	—1·0	0·60	+0·37
Agra	91·3	56·0	73·7	—4·1	...	—0·76	82·1	48·6	65·3	—2.2	...	—0·12	75·5	47·7	61·6	+0·9	0.94	+0·67
Meerut (*)	...	...	...	...	...	—0·56	...	...	...	...	...	—0·15	...	...	...	...	0·38	—0·03
Delhi	93·0	62·3	77·7	...	...	—0·32	82·9	53·0	67·9	...	...	—0·11	73·5	48·3	60·9	...	0·41	+0·01
Lahore	94·0	57·5	75·7	—1·1	...	—0·25	82·3	46·9	64·6	—0·5	...	—0·07	70·8	44·3	57·5	+1·2	0.26	—0·10
Multan	98·0	63·9	80·9	+0·2	...	—0·05	86·1	53·6	69·9	+0·7	...	—0·07	74·1	49·7	61·9	+2·7	0·04	—0·18
Peshawar	89·1	58·5	73·8	—0·3	...	—0·16	78·7	47·8	63·3	+0·5	0·05	—0·23	67·4	44·5	55·9	+2·4	0·39	—0·20
Manora (Karachi)	86·5	72·5	79·5	—0·9	...	—0·01	84·9	68·8	76·9	+1·1	...	—0·04	79·8	63·0	71·4	+2·5	0·36	+0·22
Ajmer	90·4	58·5	74·5	—3·8	...	—0·33	83·4	49·0	66·2	—2·1	...	—0·18	75·5	47·8	61·7	+0·6	0·51	+0·23
Deesa	100·0	61·4	80·7	—1·5	...	—0·41	94·2	55·8	75·0	—0·1	...	—0·10	88·3	52·9	70·6	+1·5	...	—0·04
Indore	87·7	60·3	74·0	—2·2	...	—1·15	81·6	53·9	67·7	—1·7	1·46	+1·05	79·4	51·2	65·3	+0·5	0·02	—0·19
Saugor	86·2	64·6	75·4	—1·9	0·15	—0·87	79·9	58·8	69·3	—0·9	1·86	+1·40	75·8	54·5	65·1	+0·3	1·44	+1·00
Jubbulpore	86·6	60·7	73·7	...	0·71	—1·10	81·4	52·8	67·1	...	0·63	+0·06	78·2	48·9	63·5	...	0·39	+0·10
Nagpur	89·2	65·2	77·2	—2·3	0·59	—1·51	83·7	57·1	70·4	—2·4	1·31	+0·60	82·1	54·1	68·1	+0·1	...	—0·54
Bombay	91·3	76·5	83·9	+1·9	0·21	—1·95	87·2	71·4	79·3	—1·5	3·23	+2·82	87·7	70·1	78·9	+1·5	...	—0·05
Belgaum	85·7	66·5	76·1	+1·8	3·76	—0·91	81·5	58·6	70·1	—1·9	2·24	+0·50	81·4	57·2	69·3	—0·8	...	—0·37
Bangalore	83·4	67·1	75·3	+1·6	9·15	+3·25	79·2	61·3	70·3	—0·7	1·06	—1·88	78·2	58·6	68·4	—0·3	0·20	—0·28
Madras	88·3	75·4	81·9	—0·3	16·82	+5·10	84·8	71·0	77·9	—0·9	1·86	—12·39	82·4	68·3	75·3	—1·3	2·19	—3·62
Bellary	91·9	72·7	82·3	+1·5	5·37	+1·47	85·6	64·5	75·1	—1·8	0·99	—1·20	83·8	61·2	72·5	—1·3	...	—0·11
Darjeeling	61·3	51·0	56·1	+0·3	12·14	+7·60	51·8	42·2	47·0	—2·2	0·86	+0·08	48·5	37·5	43·0	—0·1	0·72	+0·48
Mussooree	66·0	51·5	58·7	+0·6	...	...	...	46·0	...	...	...	...	52·1	37·8	44·9	—0·8	4·05	...

(*) Reports only rainfall.

TABLE B.—POPULATIONS (UNDER REGISTRATION) ACCORDING TO 1931 CENSUS COMPARED WITH ESTIMATED POPULATIONS ON 30TH JUNE, 1934.

	Rural.		Urban.		Total.		Male.		Female.	
	Census.	Estimated.	Census.	Estimated.	Census.	Estimated.	Census.	Estimated.	Census.	Estimated.
BRITISH INDIA .	239,216,274	248,507,310	26,472,590	27,246,260	265 688,864	275,753,570	136,882,928	142,076,785	128,805,936	133,676,785
N.-W.F. P. .	2,043,537	2,107,474	315,174	325,537	2,358,711	2,433,011	1,268,513	1,313,322	1,090,198	1,119,689
Punjab . .	20,337,938	21,410,961	3,122,329	3,272,447	23,460,267	24,683,408	12,798,121	13,443,644	10,662,146	11,239,764
Delhi . .	197,060	206,486	439,180	461,674	636,246	668,160	369,497	386,527	266,749	281,633
U.P. . . .	44,665,155	46,648,250	3,743,608	3,911,147	48,408,763	50,559,397	25,445,006	26,566,487	22,963,757	23,992,910
B. & O. . . .	36,265,937	37,606,976	1,411,639	1,443,053	37,677,576	39,050,029	18,794,138	19,473,035	18,883,438	19,576,994
Bengal . .	46,389,495	47,314,260	3,511,585	3,522,918	49,901,080	50,837,178	25,927,428	26,423,268	23,973,652	24,413,910
C. P.	13,844,061	14,491,967	1,663,662	1,745,740	15,507,723	16,237,707	7,761,818	8,114,787	7,745,905	8,122,920
Bombay . .	17,605,704	18,365,806	4,203,052	4,304,477	21,808,756	22,670,283	11,458,782	11,911,499	10,349,974	10,758,784
Madras . . .	38,907,511	40,706,761	6,268,369	6,445,375	45,175,880	47,152,136	22,303,255	23,338,240	22,872,625	23,813,896
Coorg . .	153,500	154,598	9,827	9,589	163,327	164,187	90,575	90,924	72,752	73,263
Assam . .	7,733,479	7,995,445	194,474	202,160	7,927,953	8,197,605	4,187,085	4,321,158	3,740,868	3,876,447
Burma . .	10,692,798	11,103,725	1,409,492	1,421,931	12,102,290	12,525,656	6,182,629	6,389,721	5,919,661	6,135,935
Ajmer-Merwara .	380,093	394,601	180,199	180,212	560,292	574,813	296,081	304,173	264,211	270,640

TABLE C.—ESTIMATED POPULATION BY SEX AND AGE.

	N.-W. F. P.		Punjab.		Delhi.		U. P.		B. & O.		Bengal.		C. P.	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
Under 1 year .	38,931	37,009	463,040	455,751	10,608	10,498	780,689	783,032	476,157	485,182	842,448	845,330	280,880	287,263
1— 5 years .	160,261	156,306	1,529,607	1,467,943	35,920	35,142	3,033,857	3,061,205	2,356,297	2,489,088	3,059,440	3,146,415	961,313	1,008,891
5—10 years .	186,739	152,180	1,765,273	1,525,727	41,180	34,908	3,389,346	2,923,983	2,738,391	2,519,539	3,614,833	3,206,898	1,043,510	1,007,612
10—15 years .	166,680	125,890	1,640,258	1,344,048	41,512	33,125	3,141,030	2,562,847	2,385,517	2,118,989	3,162,775	2,824,566	944,331	893,458
15—20 years .	115,625	99,184	1,256,046	1,036,572	41,537	30,583	2,405,063	2,104,721	1,620,465	1,680,462	2,315,167	2,579,833	714,735	750,183
20—30 years .	226,156	213,905	2,330,975	1,955,004	85,316	57,385	4,744,943	4,378,765	3,334,464	3,548,015	4,840,002	4,823,418	1,439,024	1,467,535
30—40 years .	180,595	152,291	1,750,790	1,370,321	62,885	37,073	3,845,516	3,433,712	2,812,098	2,837,962	3,913,554	3,432,721	1,129,573	1,103,643
40—50 years .	114,377	92,163	1,207,340	954,367	36,858	21,919	2,682,756	2,328,532	1,932,414	1,878,122	2,473,753	1,921,507	809,392	758,413
50—60 years .	68,759	52,908	794,488	604,846	18,601	12,375	1,543,227	1,403,464	1,108,394	1,140,296	1,320,292	1,127,418	468,726	464,600
60 years and over	55,198	37,853	705,828	525,185	12,111	8,624	1,000,020	1,012,648	708,838	879,339	881,004	805,805	323,303	381,323

	Bombay.		Madras.		Coorg.		Assam.		Burma.		Ajmer-Merwara.		Total.	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
Under 1 year .	335,837	337,704	650,844	669,708	2,135	2,201	142,714	109,173	161,359	171,173	9,527	9,612	4,195,746	4,203,379
1— 5 years .	1,343,246	1,361,251	2,711,646	2,786,916	7,570	7,722	222,941	163,410	677,201	705,115	33,904	34,208	16,131,965	16,424,403
5—10 years .	1,543,611	1,388,236	3,059,845	2,994,378	9,564	9,153	409,372	288,445	779,772	769,624	37,403	32,947	18,621,490	16,855,397
10—15 years .	1,382,086	1,192,506	2,814,043	2,667,770	10,032	9,024	645,768	488,953	728,664	704,331	35,344	29,863	17,098,806	14,997,130
15—20 years .	1,040,516	988,694	2,040,362	2,183,830	9,164	7,563	767,466	746,131	593,637	615,085	30,373	26,775	12,951,089	12,856,930
20—30 years .	2,189,776	2,033,487	3,915,736	4,499,543	19,695	15,346	356,497	394,787	1,176,636	1,129,143	56,777	49,140	24,718,550	24,572,717
30—40 years .	1,849,784	1,496,103	3,322,308	3,297,458	16,402	10,384	496,830	442,825	934,528	788,480	41,005	35,762	20,358,747	18,135,648
40—50 years .	1,165,317	969,983	2,328,922	2,194,150	9,414	5,966	584,362	528,918	613,749	548,101	32,442	26,662	13,989,575	12,222,993
50—60 years .	644,093	578,287	1,411,970	1,396,842	4,435	3,470	558,931	576,402	400,103	385,758	18,159	15,349	8,357,520	7,757,665
60 years and over	417,232	412,533	1,082,564	1,123,301	2,514	2,434	136,276	137,403	324,072	319,174	9,238	10,322	5,653,298	5,650,523

Table D.—Births.

	Births.			Birth rate p. m.			Males born to every 100 females.	Excess of birth rate over death rate.
	M.	F.	Total.	M.	F.	Total.		
British India	**4,827,379**	**4,461,518**	**9,288,897**	**17·5**	**16·2**	**33·7**	**108**	**8·8**
N.-W. F. P.	41,004	31,713	72,717	17	13	30	129	9
Punjab	495,767	442,863	938,630	20	18	38	112	12
Delhi	12,750	11,885	24,635	19	18	37	107	8
U. P.	941,838	836,954	1,778,792	19	17	35	113	10
B. & O.	652,829	615,501	1,268,330	17	16	32	106	7
Bengal	759,722	704,798	1,464,520	15	14	29	108	6
C. P.	357,503	337,216	694,719	22	21	43	106	7
Bombay	404,571	375,950	780,521	18	17	34	108	10
Madras	836,444	797,552	1,633,996	18	17	35	105	11
Coorg	2,134	1,984	4,118	13	12	25	108	2
Assam	125,740	117,016	242,756	15	14	30	107	11
Burma	186,503	179,225	365,728	15	14	29	104	9
Ajmer-Merwara	10,574	8,861	19,435	18	15	34	119	

Table E.—Total Births by Months.

	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.	Rate p. m. 1934.	Rate p. m. 1933.
British India	**810,504**	**750,160**	**794,143**	**752,165**	**699,951**	**648,449**	**713,144**	**768,909**	**790,491**	**857,106**	**850,926**	**852,949**	**9,288,897**	**33·7**	**35·5**
N. W. F. P.	6,638	6,425	7,324	5,827	6,058	4,976	4,798	5,965	5,804	5,888	6,231	6,783	72,717	30	29
Punjab	90,394	80,711	79,319	66,615	65,070	56,963	59,082	70,641	81,390	91,630	96,165	100,650	938,630	38	43
Delhi	2,368	1,910	1,915	1,662	1,538	1,388	1,492	1,957	2,330	2,776	2,731	2,573	24,635	37	44
U. P.	161,563	147,535	148,397	147,837	128,278	121,419	144,203	160,206	161,837	164,898	144,264	148,355	1,778,792	35	38
B. & O.	102,472	102,585	108,691	112,125	104,482	88,364	93,735	104,859	111,495	116,452	110,241	112,829	1,268,330	32	35
Bengal	141,392	140,595	148,653	124,806	100,264	82,917	80,532	82,869	97,122	134,578	165,638	165,134	1,464,520	29	29
C. P.	57,119	51,172	56,118	55,404	53,237	51,458	58,226	67,805	65,712	65,255	59,325	53,888	694,719	43	43
Bombay	65,666	58,753	64,820	60,728	61,177	58,798	65,806	71,153	68,581	71,427	68,202	65,410	780,521	34	35
Madras	123,763	108,863	128,466	127,536	133,156	135,491	151,111	154,224	147,793	146,078	139,931	137,584	1,633,996	35	37
Coorg	281	348	391	343	360	395	373	375	372	308	276	296	4,118	25	25
Assam	26,027	23,030	21,265	18,008	14,652	14,245	15,795	16,374	18,699	23,160	25,539	25,962	242,756	30	30
Burma	31,074	26,819	27,276	29,852	30,287	30,688	36,645	30,716	27,626	32,668	30,611	31,466	365,728	29	29
Ajmer-Merwara	1,747	1,414	1,508	1,422	1,397	1,347	1,346	1,745	1,730	1,988	1,772	2,019	19,435	34	38

Table F.—Deaths.

	Estimated population.	Area in sq. miles.	Density per sq. mile.	Deaths. M.	Deaths. F.	Deaths. Total.	Death rate p.m. M.	Death rate p.m. F.	Death rate p.m. Total.
British India	**275,753,570**	**890,116**	**310**	**3,570,543**	**3,285,701**	**6,856,244**	**25·1**	**24·6**	**24·9**
N.-W. F. P.	2,433,011	13,308	183	27,389	22,276	49,665	21	20	20
Punjab	24,683,408	96,614	255	346,156	303,619	649,775	26	27	26
Delhi	668,160	578	1,156	10,039	9,020	19,059	26	32	29
U. P.	50,559,397	106,248	476	684,543	610,551	1,295,094	26	25	26
B. & O.	39,050,029	83,054	470	509,759	471,840	981,599	26	24	25
Bengal	50,837,178	72,514	701	610,731	566,156	1,176,887	23	23	23
C. P.	16,237,707	99,920	163	302,031	275,104	577,135	37	34	36
Bombay	22,670,283	123,069	184	285,713	268,598	554,311	24	25	24
Madras	47,152,136	142,277	331	570,915	556,254	1,127,169	24	23	24
Coorg	164,187	1,593	103	1,906	1,890	3,796	21	26	23
Assam	8,197,605	31,382	261	81,947	73,754	155,701	19	19	19
Burma	12,525,656	116,848	107	130,725	118,822	249,547	20	19	20
Ajmer-Merwara	574,813	2,711	212	8,689	7,817	16,506	29	29	29

Table G.—Deaths by Months.

	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sep.	Oct.	Nov.	Dec.	Total.	Rate p. m. 1934.	Rate p. m. 1933.
British India	**559,254**	**493,629**	**538,326**	**575,943**	**565,300**	**519,892**	**550,906**	**615,763**	**605,392**	**604,069**	**601,380**	**626,390**	**6,856,244**	**24·9**	**22·4**
N.-W. F. P.	5,587	5,164	4,766	4,025	3,892	3,730	3,222	3,366	3,623	3,310	4,093	4,887	49,665	20	21
Punjab	59,321	52,708	53,038	52,021	58,290	51,871	44,068	45,714	50,804	55,335	58,097	68,508	649,775	26	27
Delhi	1,476	1,226	1,373	1,503	1,701	1,620	1,452	1,609	1,762	1,760	1,716	1,861	19,059	29	32
U. P.	78,932	80,899	98,832	120,909	119,280	117,528	111,349	117,770	115,509	120,665	106,884	106,537	1,295,094	26	18
B. & O.	73,499	63,136	66,676	83,241	84,730	76,525	89,233	103,106	98,945	88,647	78,087	75,774	981,599	25	22
Bengal	119,630	95,899	97,975	104,540	89,586	72,564	78,945	85,069	85,472	97,699	120,748	128,760	1,176,887	23	24
C. P.	35,402	33,790	41,469	47,584	46,886	46,731	46,027	62,103	68,150	60,505	47,946	40,542	577,135	36	26
Bombay	50,204	43,840	50,215	44,530	39,522	33,490	42,630	55,510	51,323	49,706	47,743	45,596	554,311	24	24
Madras	99,067	87,128	93,460	85,592	89,295	83,370	94,974	103,376	93,693	87,644	97,214	112,356	1,127,169	24	23
Coorg	225	267	344	363	341	392	409	365	314	271	267	238	3,796	23	24
Assam	14,525	11,902	11,148	12,026	13,521	14,013	13,904	11,975	12,407	12,584	13,185	14,511	155,701	19	20
Burma	20,152	16,419	17,463	18,043	16,982	17,002	23,728	24,384	22,041	24,397	23,958	24,978	249,547	20	18
Ajmer-Merwara	1,234	1,251	1,567	1,566	1,274	1,056	965	1,416	1,349	1,544	1,442	1,842	16,506	29	28

TABLE H.—DEATH RATES *PER MILLE* BY MONTHS.

	Jan.	Feb.	March.	April.	May.	June.	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total.
BRITISH INDIA	24	21	23	25	25	23	24	27	26	26	26	27	24·9
N.-W. F. P.	28	25	24	20	19	18	16	17	18	16	20	24	20
Punjab	29	26	26	25	28	25	21	22	25	27	28	33	26
Delhi	27	22	25	27	31	29	26	29	32	32	31	33	29
U. P.	19	19	23	29	28	28	26	28	27	29	25	25	26
B. & O.	23	19	20	26	26	24	27	32	30	27	24	23	25
Bengal	28	23	23	25	21	17	19	20	20	23	29	30	23
C. P.	26	25	31	35	35	35	34	46	50	45	35	30	36
Bombay	27	23	27	24	21	18	23	29	27	26	25	24	24
Madras	25	22	24	22	23	21	24	26	24	22	25	29	24
Coorg	16	20	25	27	25	29	30	27	23	20	20	17	23
Assam	21	17	16	18	20	21	20	18	18	18	19	21	19
Burma	19	16	17	17	16	16	23	23	21	23	23	24	20
Ajmer-Merwara	26	26	33	33	27	22	20	30	28	32	30	38	29

TABLE I.—DEATHS BY MONTHS IN RURAL AREAS.

	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sep.	Oct.	Nov.	Dec.	Total.	Rate p. m. 1934.	Rate p. m. 1933.
BRITISH INDIA	506,358	444,669	482,679	519,381	508,089	469,547	496,833	550,465	546,630	549,269	547,700	570,856	6,192,476	24·9	22·4
N.-W. F. P.	4,871	4,666	4,141	3,585	3,397	3,248	2,802	2,922	3,227	2,908	3,633	4,358	43,758	21	21
Punjab	54,027	47,754	47,829	46,956	52,524	45,910	39,159	40,163	44,244	49,830	52,474	61,951	582,821	27	28
Delhi	576	468	459	602	638	666	534	463	595	692	754	788	7,235	35	41
U. P.	70,072	71,915	86,743	106,288	104,196	104,607	98,698	102,067	101,750	108,338	96,210	96,369	1,147,253	25	17
B. & O.	70,910	61,402	64,877	81,180	82,598	74,780	86,787	100,141	96,603	86,743	76,236	74,194	956,451	25	22
Bengal	112,582	90,014	91,592	98,183	83,781	67,950	73,515	78,890	79,639	91,885	114,134	121,922	1,104,087	23	24
C. P.	31,672	30,185	36,615	42,593	41,558	42,258	41,010	54,516	61,575	54,944	43,454	36,235	516,615	36	26
Bombay	40,796	34,734	40,451	35,068	31,013	26,248	33,628	44,347	41,669	40,197	38,717	36,180	443,048	24	24
Madras*	89,151	77,850	83,961	76,989	80,447	75,337	86,053	93,418	85,392	79,330	87,854	102,184	1,017,966	25	24
Coorg	203	234	307	314	317	352	374	327	274	236	234	213	3,385	22	23
Assam	14,176	11,692	10,930	11,801	13,225	13,728	13,606	11,624	12,085	12,278	12,851	14,250	152,246	19	20
Burma	16,547	12,914	13,678	14,819	13,625	13,811	20,132	20,712	18,627	20,866	20,328	21,066	207,125	19	17
Ajmer-Merwara	775	841	1,096	1,003	770	652	535	875	950	1,022	821	1,146	10,486	27	24

* Inclusive of figures of towns other than municipalities.

TABLE J.—DEATHS BY MONTHS IN URBAN AREAS.

	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sep.	Oct.	Nov.	Dec.	Total.	Rate p. m. 1934.	Rate p. m. 1933.
BRITISH INDIA .	52,896	48,960	55,647	56,562	57,211	50,345	54,073	65,298	58,762	54,800	53,680	55,534	663,768	24·4	22·2
N.-W. F. P. . .	716	498	625	440	495	482	420	444	396	402	460	529	5,907	18	19
Punjab . . .	5,294	4,954	5,209	5,065	5,766	5,961	4,909	5,551	6,560	5,505	5,623	6,557	66,954	20	21
Delhi . . .	900	758	914	901	1,063	954	918	1,146	1,167	1,068	962	1,073	11,824	26	28
U. P. . . .	8,860	8,984	12,089	14,621	15,084	12,921	12,651	15,703	13,759	12,327	10,674	10,168	147,841	38	29
B. & O. . .	2,589	1,734	1,799	2,061	2,132	1,745	2,446	2,965	2,342	1,904	1,851	1,580	25,148	17	15
Bengal . . .	7,048	5,885	6,383	6,357	5,805	4,614	5,430	6,179	5,833	5,814	6,614	6,838	72,800	21	21
C. P. . . .	3,730	3,605	4,854	4,991	5,328	4,473	5,017	7,587	6,575	5,561	4,492	4,307	60,520	35	26
Bombay . . .	9,408	9,106	9,764	9,462	8,509	7,242	9,002	11,163	9,654	9,511	9,026	9,446	111,263	26	15
Madras* . .	9,916	9,278	9,499	8,603	8,848	8,033	8,921	9,958	8,301	8,314	9,360	10,172	109,203	17	17
Coorg . . .	22	33	37	49	24	40	35	38	40	35	33	25	411	43	47
Assam . . .	319	210	218	225	296	285	298	351	322	306	334	261	3,455	17	17
Burma . . .	3,605	3,505	3,785	3,224	3,357	3,191	3,596	3,672	3,414	3,531	3,630	3,912	42,422	30	27
Ajmer-Merwara .	459	410	471	563	504	404	430	541	399	522	621	696	6,020	23	37

* For municipalities only.

TABLE K.—DEATHS ACCORDING TO AGE.

	Under one year.		1—5 years.		5—10 years.		10—15 years.		15—20 years.	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
BRITISH INDIA*	846,302	712,124	593,223	562,432	184,965	168,799	103,301	91,825	109,483	129,164
N.-W. F. P.	5,621	4,144	4,654	4,018	1,588	1,449	920	815	901	832
Punjab	95,359	80,536	57,359	51,800	21,501	19,060	15,644	14,404	15,317	14,213
Delhi	2,799	2,434	1,651	1,622	467	383	346	357	382	407
U. P.	180,777	147,656	159,169	141,699	32,050	28,649	19,443	17,991	18,005	19,528
B. & O.	104,083	86,109	112,097	106,157	33,335	28,223	17,651	13,782	16,941	17,016
Bengal	148,592	128,602	86,294	85,388	45,502	41,307	25,562	21,547	25,067	34,397
C. P.	Not available.									
Bombay	70,727	59,908	55,141	55,763	13,173	13,616	7,382	7,525	6,878	8,855
Madras*†	170,448	144,908	88,200	87,933	26,157	25,555	9,704	9,533	18,376	24,851
Coorg	405	375	233	228	92	106	72	69	110	115
Assam	21,893	18,250	11,909	11,342	5,561	4,884	2,896	2,442	2,781	4,366
Burma	43,223	37,015	14,469	14,679	5,190	5,298	3,479	3,170	4,542	4,322
Ajmer-Merwara	2,375	2,187	2,047	1,803	349	269	202	190	183	262

	20—30 years.		30—40 years.		40—50 years.		50—60 years.		60 years & upwards.	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
BRITISH INDIA	232,278	288,455	245,978	230,987	248,169	188,592	248,040	202,783	456,939	435,590
N.-W. F. P.	2,282	2,262	2,520	2,440	2,490	1,997	2,613	1,858	3,800	2,461
Punjab	21,470	21,545	21,763	20,644	23,504	19,827	25,198	20,939	49,041	40,651
Delhi	772	892	760	695	739	510	729	483	1,454	1,237
U. P.	42,420	51,675	43,440	43,650	47,094	36,361	50,420	39,727	91,725	83,615
B. & O.	42,095	46,472	43,278	39,449	40,537	31,624	40,537	37,990	59,205	65,018
Bengal	53,691	70,038	55,373	47,868	52,355	37,660	47,409	37,444	70,886	61,905
C. P.	Not available.									
Bombay	18,214	24,068	21,033	19,779	22,856	15,841	22,432	16,047	47,877	47,196
Madras†	34,567	50,323	38,419	38,823	40,719	31,925	42,097	35,799	102,394	106,758
Coorg	235	320	265	263	206	126	159	127	129	161
Assam	6,033	9,744	7,570	6,549	7,048	4,713	6,695	4,558	9,561	6,906
Burma	10,000	10,482	11,130	10,312	9,977	7,589	8,968	7,306	19,747	18,649
Ajmer-Merwara	499	634	487	515	644	419	783	505	1,120	1,033

* Excluding C. P., figures for which are not available.
† Including Europeans and Anglo-Indians.

TABLE L.—DEATH RATES PER MILLE ACCORDING TO AGE.

	*Under 1 year.		1—5 years.		5—10 years.		10—15 years.		15—20 years.	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
BRITISH INDIA†	202	169	37	34	10	10	6	6	8	10
N.-W. F. P.	144	112	29	26	9	10	6	6	8	8
Punjab	206	177	37	35	12	12	10	11	12	14
Delhi	263	232	46	46	11	11	8	11	9	13
U. P.	232	189	52	46	10	10	6	7	7	9
B. & O.	219	177	48	43	12	11	7	7	10	10
Bengal	176	152	28	27	13	13	8	8	11	13
Bombay	210	177	41	41	9	10	5	6	7	9
Madras	262	216	33	32	9	9	4	4	9	11
Coorg	190	170	31	30	10	12	7	8	12	15
Assam	153	167	53	69	14	17	4	5	4	6
Burma	268	216	21	21	7	7	5	5	8	7
Ajmer-Merwara	249	228	60	53	9	8	6	6	6	10

	20—30 years.		30—40 years.		40—50 years.		50—60 years.		60 years & upwards.	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
BRITISH INDIA†	9	12	12	13	18	15	30	26	81	77
N.-W. F. P.	10	11	14	16	22	22	38	35	69	65
Punjab	9	11	12	15	19	21	32	35	69	77
Delhi	9	16	11	19	20	28	39	39	120	143
U. P.	9	12	11	13	18	17	33	28	92	82
B. & O.	13	13	15	14	21	17	37	33	83	74
Bengal	11	15	14	15	21	20	36	33	80	77
Bombay	8	12	11	13	20	16	35	28	11	11
Madras	9	11	12	12	18	14	30	26	95	95
Coorg	12	21	16	25	22	21	36	36	51	66
Assam	17	24	15	15	12	9	12	8	70	50
Burma	8	9	12	13	16	14	22	19	61	58
Ajmer-Merwara	9	13	12	14	20	16	43	33	121	100

* Worked on live-births.

† Excluding C. P., figures for which are not available.

TABLE M.—DEATHS ACCORDING TO AGE IN RURAL AREAS.

	Under one year.		1—5 year		5—10 years.		10—15 years.		15—20 years.	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
BRITISH INDIA*	**745,773**	**627,275**	**538,770**	**508,318**	**171,579**	**155,528**	**94,853**	**82,028**	**99,020**	**114,259**
N.-W. F. P.	4,828	3,551	4,099	3,587	1,463	1,325	849	692	802	696
Punjab	84,494	71,156	51,335	46,032	19,842	17,401	14,329	12,977	13,908	12,573
Delhi	920	773	695	644	229	160	156	140	153	120
U. P.	154,964	125,758	143,801	125,954	29,303	25,845	17,722	15,478	16,224	15,926
B. & O.	101,224	83,868	109,782	104,150	32,563	27,476	17,188	13,285	16,400	16,366
Bengal	140,796	122,008	82,549	81,979	43,665	39,723	24,246	20,359	23,500	32,793
C. P. †	...	...	...	...	...	...	...	...	...	...
Bombay	53,736	45,389	45,087	45,575	11,380	11,681	6,290	6,263	5,389	6,741
Madras	145,314	124,134	75,433	75,046	22,766	22,205	8,067	7,658	15,937	20,943
Coorg	396	370	224	211	86	99	64	62	99	103
Assam	21,475	17,887	11,704	11,138	5,484	4,819	2,836	2,392	2,718	4,262
Burma	36,372	31,239	12,649	12,799	4,527	4,581	2,954	2,609	3,767	3,593
Ajmer-Merwara	1,254	1,142	1,412	1,203	271	213	143	113	123	143

	20—30 years.		30—40 years.		40—50 years.		50—60 years.		60 years & upwards	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
BRITISH INDIA*	**203,332**	**253,748**	**219,109**	**207,512**	**221,647**	**170,949**	**222,766**	**185,488**	**405,234**	**386,744**
N.-W. F. P.	1,995	1,978	2,258	2,219	2,206	1,819	2,352	1,703	3,255	2,081
Punjab	19,136	18,951	19,740	18,599	21,302	18,162	22,960	19,233	44,090	36,601
Delhi	269	279	279	252	294	234	314	233	605	486
U. P.	38,424	44,046	39,868	39,275	43,406	33,408	46,456	36,891	81,099	73,405
B. & O.	40,839	45,077	42,034	38,449	39,376	30,889	39,515	37,266	57,431	63,273
Bengal	46,990	64,445	50,758	44,716	48,300	34,944	43,898	34,995	65,760	57,663
C. P.†	...	...	...	...	...	...	...	...	...	...
Bombay	13,692	18,285	16,203	15,971	18,150	13,136	17,828	13,407	39,583	39,253
Madras	28,269	41,853	31,874	32,453	33,774	27,035	35,191	30,637	86,724	90,724
Coorg	179	271	195	226	168	110	143	118	113	148
Assam	5,800	9,542	7,300	6,414	6,815	4,614	6,520	4,480	9,314	6,732
Burma	7,398	8,656	8,282	8,579	7,387	6,304	7,027	6,154	16,514	15,734
Ajmer-Merwara	341	365	318	359	469	294	562	371	746	644

* Excluding C. P., figures for which are not available.
† Figures not available.

TABLE N.—DEATHS ACCORDING TO AGE IN URBAN AREAS.

	Under one year.		1—5 years.		5—10 years.		10—15 years.		15—20 years.	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
BRITISH INDIA*	**100,529**	**84,849**	**54,453**	**54,114**	**13,386**	**13,271**	**8,448**	**9,797**	**10,463**	**14,905**
N.-W. F. P.	793	593	555	431	125	124	71	123	99	136
Punjab	10,865	9,380	6,024	5,768	1,659	1,659	1,315	1,427	1,409	1,640
Delhi	1,879	1,661	956	978	238	223	190	217	229	287
U. P.	25,813	21,898	15,368	15,745	2,747	2,804	1,721	2,513	1,781	3,602
B. & O.	2,859	2,241	2,315	2,007	772	747	463	497	541	650
Bengal	7,796	6,594	3,745	3,409	1,837	1,584	1,316	1,188	1,567	1,604
C. P.†	...	...	...	...	...	...	...	...	...	...
Bombay	16,991	14,519	10,054	10,188	1,793	1,935	1,083	1,262	1,489	2,114
Madras	25,134	20,774	12,767	12,887	3,391	3,350	1,637	1,875	2,439	3,908
Coorg	9	5	9	17	6	7	8	7	11	12
Assam	418	363	205	204	77	65	60	50	63	104
Burma	6,851	5,776	1,820	1,880	663	717	525	561	775	729
Ajmer-Merwara	1,121	1,045	635	600	78	56	59	77	60	119

	20—30 years.		30—40 years.		40—50 years.		50—60 years.		60 years & upwards.	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
BRITISH INDIA*	**28,946**	**34,707**	**26,869**	**23,475**	**26,522**	**17,643**	**25,274**	**17,295**	**51,705**	**48,846**
N.-W. F. P.	287	284	262	221	284	178	261	155	545	380
Punjab	2,334	2,594	2,023	2,045	2,202	1,665	2,238	1,706	4,951	4,050
Delhi	503	613	421	443	445	276	415	250	849	751
U. P.	3,996	7,629	3,572	4,375	3,688	2,953	3,964	2,836	10,626	10,210
B. & O.	1,256	1,395	1,244	1,000	1,161	735	1,022	724	1,774	1,745
Bengal	6,701	5,593	4,615	3,152	4,055	2,716	3,511	2,449	5,126	4,242
C. P.†	...	...	...	...	...	...	...	...	...	...
Bombay	4,522	5,783	4,830	3,808	4,706	2,705	4,604	2,640	8,294	7,943
Madras	6,298	8,470	6,545	6,370	6,945	4,890	6,906	5,162	15,670	16,034
Coorg	56	49	70	37	38	16	16	9	16	13
Assam	233	202	270	135	233	99	175	78	247	174
Burma	2,602	1,826	2,848	1,733	2,590	1,285	1,941	1,152	3,233	2,915
Ajmer-Merwara	158	269	169	156	175	125	221	134	374	389

* Excluding C. P., figures for which are not available.

† Figures not available.

TABLE O.—INFANTILE MORTALITY RATE IN TOWNS HAVING A POPULATION OF 30,000 AND OVER.

Towns.	Rates p. m. live births.
N.-W. F. Province.	
Peshawar	150
Dera Ismail Khan	155
Delhi.	
Delhi city	219
New Delhi	95
United Provinces.	
Dehra	303
Saharanpur	379
Hardwar Union	341
Muzaffarnagar	223
Meerut	165
Khurja	329
Aligarh	201
Hathras	291
Muttra	268
Agra	230
Bareilly	195
Budaun	294
Moradabad	258
Amroha	238
Sambhal	297
Shahjahanpur	158
Pilibhit	280
Farrukhabad-*cum*-Fatehgarh	325
Etawah	420
Cawnpore	294
Allahabad	252
Jhansi	327
Benares	329
Mirzapur-Bindhachal	252
Jaunpur	223
Gorakhpur	249
Lucknow	275
Fyzabad-Ajodhya	205
Bahraich	214
Bengal.	
Burdwan	79
Asansol	176
Bankura	144
Midnapur	62
Hooghly-Chinsura	141
Serampur	114
Bengal—contd.	
Howrah	280
Bally	82
South Suburban	200
Baranagar	199
Kamarhati	117
Titagarh	197
Naihati	117
Bhatpara	127
Calcutta	259
Serajganj	120
Dacca	192
Narayanganj	219
Mymensingh	213
Barisal	210
Chittagong	178
Comilla	116
Central Provinces.	
Nagpur	296
Jubbulpore	295
Saugor	315
Khandwa	276
Burhanpur	247
Raipur	326
Bilaspur	260
Amraoti	198
Akola	248
Bombay.	
City of Bombay	246
Jalgaon	209
Dhulia	183
Surat	291
Broach	144
Nadiad	353
Godhra	219
Ahmedabad	316
Ahmednagar	180
Poona city	334
Nasik	377
Malegaon	255
Bandra	164
Kurla	192
Belgaum	161
Dharwar	106
Hubli	80
Gadag-Bettigeri	197

TABLE O.—INFANTILE MORTALITY RATE IN TOWNS HAVING A POPULATION OF 30,000 AND OVER—*concld.*

Towns.	Rates p. m. live births.
Bombay—contd.	
Bijapur	120
Sholapur	240
Karachi	142
Hyderabad	182
Sukkur	126
Shikarpur	175
Madras.	
Bellary	311
Adoni	121
Conjeeveram	180
Saidapet	202
Coimbatore	236
Erode	129
Berhampur	134
Cocanada	253
Rajahmundry	297
Ellore	89
Guntur	177
Tenali	170
Bezwada	282
Masulipatam	234
Kurnool	127
Madras	232
Madura	269
Dindigul	74
Calicut	106
Palghat	176
Cannanore	143
Tellicherry	114
Nellore	227
Vellore	183
Virudhunagar	209
Srivilliputtur	174
Salem	174
Cuddalore	195
Mangalore	106
Tanjore	215
Kumbakonam	159
Negapatam	208
Mayavaram	176
Tuticorin	214
Tinnevelly	262
Palamcottah	215
Trichinopoly	187
Vizagapatam	287
Vizianagram	221
Burma.	
Akyab	272
Rangoon	271
Bassien	308
Moulmein	199
Mandalay	257

Appendix II

relating to

Section II.

TABLE A.—DEATHS FROM CHOLERA FROM 1905 TO 1934.

Year.	British India.	N.-W. F. P.	Punjab.	Delhi.	U. P.	B. & O.	Bengal.	C. P.	Bombay.	Madras.	Coorg.	Assam.	Burma.	Ajmer-Merwara.	Indian States. Rajputana.	Central India.	Hyderabad.	Mysore.
1905	441,786	300	2,197	...	121,790	93,590	172,178	1,217	5,396	16,888	...	22,883	2,347	...	8	27	64	628
1906	690,521	...	4,107	127	149,549	131,571	185,621	38,768	46,119	142,811	10	33,682	7,872	284	4,714	10,147	1,061	7,222
1907	408,102	266	429	8	22,438	115,801	158,190	4,291	7,656	81,565	187	8,892	7,678	1	64	41	1	4,972
1908	591,725	2,845	12,120	177	83,544	182,377	123,471	9,048	1,759	141,970	114	22,389	11,911	...	737	1,730	937	2,149
1909	239,231	134	1,501	12	21,823	32,011	88,356	7,687	28,714	39,424	99	8,081	11,389	...	403	1,421	164	1,629
1910	430,451	1,605	2,130	1	102,402	126,382	119,686	5,316	3,694	32,594	56	34,512	2,011	2	8	2,864	2	1,812
1911	354,005	12	1,213	47	117,689	88,583	67,750	2,998	5,817	58,174	6	7,475	4,191	50	85	1,054	803	210
1912	407,769	1,329	1,833	406	18,894	77,023	95,467	34,313	64,505	92,497	...	14,303	7,186	13	414	9,080	1,190	6,748
1913	294,815	175	5,811	37	60,427	70,379	78,898	15,286	5,134	37,730	92	16,407	4,339	...	4,085	2,823	1,322	8,062
1914	280,730	2,300	6,656	12	32,498	32,115	89,224	20,345	17,779	68,449	...	9,270	2,073	9	1,627	10,075	5,893	840
1915	404,472	932	13,196	92	90,508	88,349	130,679	5,662	377	30,093	...	26,979	17,687	3	1,981	795	2,072	178
1916	288,047	194	1,651	69	33,300	90,582	70,836	39,205	19,841	16,735	1	13,099	1,773	861	5,075	5,474	1,475	137
1917	267,002	...	1,365	12	21,440	109,620	45,021	691	17,003	58,939	32	10,953	1,914	12	69	589	2,579	7,288
1918	560,802	31	257	3	119,746	205,584	82,379	3,351	8,834	122,263	1	14,077	4,269	7	3	485	7,200	3,153
1919	578,426	4,400	8,561	66	81,365	104,727	124,949	62,089	51,551	98,262	157	33,080	13,260	59	842	8,309	13,321	2,306
1920	130,140	2	138	7	6,952	26,341	54,199	3,491	2,047	31,139	6	2,421	3,396	1	508	278	57	220
1921	450,608	4,285	19,215	635	149,667	90,688	89,547	58,331	3,521	27,064	...	12,829	3,791	35	2,750	5,079	1,381	25
1922	121,679	92	128	6	2,330	26,805	51,712	64	2,768	16,502	4	16,219	5,047	2	...	...	3,288	
1923	73,002	2	11	12	2,591	8,198	41,483	1,090	9,221	5,169	...	3,728	1,488	9	9	62	1,174	79
1924	293,707	9	3,351	121	67,000	77,480	48,514	9,704	8,236	51,971	24	19,182	8,083	32	644	1,407	3,354	7,699
1925	115,645	116	3,049	50	7,653	17,336	34,276	124	57	44,815	4	6,233	1,932	...	...	43	22	...
1926	135,151	...	87	18	6,166	27,268	59,106	4,565	78	24,407	2	10,275	6,182	2	4	269	26	6
1927	304,710	2	11,286	16	28,285	49,022	118,377	16,311	26,153	35,334	...	15,392	4,528	4	1,357	2,584	8,913	1,367
1928	351,305	...	2,034	34	44,941	77,103	136,245	12,198	6,881	57,677	...	6,915	7,209	68	1,371	7,520	4,314	413
1929	295,434	30	2,309	193	50,924	104,034	81,090	6,168	9,084	25,846	1	7,765	7,970	20	722	1,155	450	140
1930	337,322	449	1,181	8	61,334	155,215	54,963	23,250	15,142	18,746	...	6,332	661	41	2,101	11,165	18,369	535
1931	220,909	105	391	61	31,118	40,943	79,073	14,135	18,646	30,232	116	5,523	534	32	294	1,411	5,653	6,385
1932	67,291	70	614	4	9,734	9,348	33,910	854	1,353	5,278	...	4,971	1,082	1	122	168	71	83
1933	68,318	...	160	...	1,915	17,514	29,242	2,152	7,797	3,851	...	5,508	179	...	35	642	4,838	90
1934	199,708	...	178	19	31,903	57,289	50,742	27,329	11,362	18,158	1	1,904	822	1	969	4,471	4,951	346

TABLE B.—DEATHS FROM CHOLERA IN RURAL AND URBAN AREAS.

	Deaths.			Rate p.m.			Mean 1929-33.	Total Villages.	Number Infected.
	R.	U.	Total.	R.	U.	Total.			
BRITISH INDIA	**187,502**	**12,206**	**199,708**	**0·8**	**0·4**	**0·7**	**0·5**	**464,296**	**36,003**
N.-W. F. P.	...	...	...	...	...	...	0·1	2,802	...
Punjab	140	38	178	...	...	...	...	34,520	78
Delhi	...	19	19	...	...	...	0·1	304	...
U. P.	30,251	1,652	31,903	0·6	0·4	0·6	0·7	105,640	4,436
B. & O.	55,883	1,406	57,289	1·5	1·0	1·5	1·7	83,402	12,200
Bengal	47,546	3,196	50,742	1·0	0·9	1·0	1·1	86,360	10,436
C. P.	24,559	2,770	27,329	1·7	1·6	1·7	0·1	39,874	3,106
Bombay	10,399	963	11,362	0·6	0·2	0·5	0·5	30,550	1,756
Madras	16,133	2,025	18,158	0·4	0·3	0·4	0·4	39,887	2,998
Coorg	1	...	1	...	...	...	0·1	298	1
Assam	1,884	20	1,904	0·2	0·1	0·2	0·8	28,333	725
Burma	706	116	822	0·1	0·1	0·1	0·2	11,587	266
Ajmer-Merwara	...	1	1	...	...	...	...	739	1

TABLE C.—DEATHS FROM CHOLERA BY MONTHS.

	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total. 1934.	Total. 1933.	Rate p.m. 1934.	Rate p.m. 1933.	Quinquennial mean.
BRITISH INDIA	**4,896**	**3,369**	**6,547**	**8,893**	**10,000**	**16,072**	**31,899**	**37,655**	**25,685**	**16,795**	**16,664**	**20,833**	**199,708**	**68,318**	**0·7**	**0·3**	**0·5**
N.-W. F. P.	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	0·1
Punjab	...	...	1	5	12	30	43	47	36	4	...	...	178	160	...	...	...
Delhi	...	...	...	1	1	1	1	7	8	...	...	...	19	...	...	...	...
U. P.	2	5	31	89	1,041	4,093	6,564	6,979	5,134	5,402	1,671	892	31,903	1,915	0·6	...	0·7
B. & O.	1,672	622	944	1,134	2,110	5,134	12,434	13,845	9,853	4,788	3,500	1,253	57,289	17,514	1·5	0·5	1·7
Bengal	1,912	2,047	5,260	6,473	5,018	2,547	2,353	1,675	919	2,267	8,569	11,702	50,742	29,242	1·0	0·6	1·1
C. P.	...	3	37	308	847	2,982	6,495	7,311	6,346	2,603	353	44	27,329	2,152	1·7	0·1	0·1
Bombay	202	106	78	470	546	406	2,285	4,152	1,696	910	377	134	11,362	7,797	0·5	0·4	0·5
Madras	601	413	457	312	314	729	1,656	3,586	1,645	722	1,859	5,864	18,158	3,851	0·4	0·1	0·4
Coorg	...	...	...	1	...	...	...	...	...	...	...	...	1	...	...	...	0·1
Assam	506	173	137	75	66	56	45	39	44	33	134	596	1,904	5,508	0·2	0·7	0·8
Burma	1	...	2	25	44	94	23	14	4	66	201	348	822	179	0·1	...	0·2
Ajmer-Merwara	...	...	...	...	1	...	...	...	...	...	...	...	1	...	...	...	...

Table D.—Deaths from Plague by months.

(i) British Provinces.

		Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total. 1934.	Total. 1933.	Rate p.m. 1934.	Rate p.m. 1933.
Grand Total	1933	6,491	5,836	5,741	3,608	2,777	1,682	3,642	6,712	7,717	8,343	7,752	9,891	...	70,192	...	...
	1934	15,923	18,497	22,451	17,642	7,538	1,702	1,045	3,268	4,367	3,761	3,118	3,987	103,299	...	...	...
British India	1933	3,644	3,455	3,993	2,800	2,276	845	1,649	3,513	4,351	4,841	4,845	6,419	...	42,631	...	0·2
	1934	11,627	14,494	19,165	15,793	6,808	1,354	624	1,718	2,019	1,996	1,842	2,691	80,131	...	0·3	...
N.-W. F. P.		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Punjab		557	630	1,180	1,957	2,788	714	34	109	2	10	48	40	8,069	1,789	0·3	0·1
Delhi		...	...	2	...	...	...	...	...	...	...	...	...	2	...	...	...
U. P.		6,269	9,061	14,087	11,942	3,454	493	61	156	133	202	456	1,374	47,688	9,835	0·9	0·2
B. & O.		608	1,084	1,587	1,380	362	38	18	33	19	7	71	204	5,411	1,635	0·1	...
Bengal		...	...	...	1	...	...	...	...	...	...	...	...	1	1	...	...
C. P.		283	184	130	9	...	...	...	51	109	121	39	41	967	1,200	0·1	0·1
Bombay		2,992	2,551	1,316	377	162	81	356	1,011	1,428	1,364	994	675	13,307	24,560	0·6	1·1
Madras		488	346	243	29	14	12	91	260	271	235	156	213	2,358	2,591	0·1	0·1
Coorg		1	1	...	2	...	...	1	...	1	2	...	2	10	48	0·1	0·3
Assam		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Burma		429	637	620	96	28	16	63	98	56	55	78	142	2,318	972	0·2	0·1
Ajmer-Merwara		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...

(ii) Indian States and Agencies.

Total	1933	2,847	2,381	1,748	808	501	837	1,993	3,199	3,366	3,502	2,907	3,472	...	27,561		
	1934	4,296	4,003	3,286	1,849	730	348	421	1,550	2,348	1,765	1,276	1,296	23,168	...		
Punjab		20	15	43	51	42	...	...	...	...	...	...	...	171	15		
U. P.		...	1	23	51	6	...	...	...	...	...	...	...	81	72		
B. & O.		...	...	...	...	...	...	...	...	...	...	...	...	...	...		
Bengal		...	...	...	...	...	...	...	...	...	...	...	...	...	...		
C. P.		...	...	...	...	...	...	...	...	...	...	...	...	...	...		
Bombay		793	727	431	206	214	71	174	500	525	497	272	137	4,547	7,012		
Madras		...	...	...	...	...	...	...	...	...	...	4	3	7	...		
Mysore		1,012	798	405	196	139	192	219	336	578	584	412	425	5,296	5,855		
Bangalore C. & M. Station		4	6	5	...	...	...	...	1	7	8	5	1	37	123		
Hyderabad		2,323	2,228	2,015	984	146	54	15	686	1,182	636	543	653	11,465	13,487		
C. I. Agency		25	24	25	13	...	...	...	...	1	3	3	3	97	50		
Baroda		8	58	42	15	...	1	...	...	14	24	24	26	212	360		
Rajputana		...	23	8	7	2	...	...	...	24	4	...	12	80	...		
Assam		...	...	...	...	...	...	...	...	...	...	...	...	...	...		
Burma		8	...	...	3	1	9	13	27	17	9	12	33	132	62		
Jammu & Kashmir		103	123	289	323	180	21	...	...	...	...	1	3	1,043	525		
Baluchistan		...	...	...	...	...	...	...	...	...	...	...	...	...	...		

TABLE E.—DEATHS FROM SMALLPOX IN RURAL AND URBAN AREAS.

	Deaths.			Death rate p. m.			Mean. 1929-33.	Deaths in children.			Percentage of deaths to total mortality.		
	R.	U.	Total.	R.	U.	Total.		Under 1 year.	1—10 years.	Total.	Under 1 year.	1—10 years.	Total.
BRITISH INDIA	**71,415**	**12,513**	**83,928**	**0·3**	**0·5**	**0·3**	**0·3**	**16,033**	**22,280**	**38,313**	**19**	**27**	**46**
N.-W. F. P.	574	41	615	0·3	0·1	0·3	0·2	162	324	486	26	53	79
Punjab	1,501	191	1,692	0·1	0·1	0·1	0·3	514	740	1,254	30	44	74
Delhi	1	21	22	...	...	...	0·5	3	13	16	14	59	73
U. P.	12,792	2,025	14,817	0·3	0·5	0·3	0·2	4,316	5,587	9,903	29	38	67
B. & O	29,434	876	30,310	0·8	0·6	0·8	0·4	2,455	5,138	7,593	8	17	25
Bengal	6,798	1,498	8,296	0·1	0·4	0·2	0·3	377	966	1,343	12	4	16
C. P.	1,171	1,111	2,282	0·1	0·6	0·1	0·2	322	1,011	1,833	36	44	80
Bombay	3,651	1,865	5,516	0·2	0·4	0·2	0·5	1,604	2,594	4,198	29	47	76
Madras	14,251	3,837	18,088	0·4	0·6	0·4	0·2	5,593	5,516	11,109	31	30	61
Coorg	41	4	45	0·3	0·4	0·3	0·1	17	5	22	38	11	49
Assam	200	6	206	...	...	...	0·1	15	14	29	7	7	14
Burma	664	937	1,601	0·1	0·7	0·1	0·1	155	372	527	10	23	33
Ajmer-Merwara	337	101	438	0·9	0·6	0·8	0·1	Not available.			...	...	...

TABLE F.—DEATHS FROM SMALLPOX BY MONTHS.

	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.	Rate p. m. 1934.	Rate p. m. 1933.
BRITISH INDIA	**6,480**	**3,110**	**10,958**	**13,099**	**12,937**	**9,508**	**6,636**	**3,875**	**2,280**	**1,940**	**2,719**	**5,386**	**83,928**	**0·3**	**0·4**
N.-W. F. P.	86	100	88	51	47	85	62	13	13	19	24	27	615	0·3	0·7
Punjab	183	188	179	198	236	191	180	76	42	22	67	130	1,692	0·1	0·5
Delhi	...	...	...	1	4	5	3	3	1	1	1	3	22	..	1·4
U. P.	783	969	1,555	1,978	2,562	2,362	1,427	716	266	191	580	1,428	14,817	0·3	0·2
B. & O.	2,866	3,416	3,896	5,153	4,874	3,314	2,232	1,211	832	539	605	1,372	30,310	0·8	1·1
Bengal	806	1,049	1,229	1,597	1,380	837	494	317	117	112	112	246	8,296	0·2	0·3
C. P.	87	147	407	427	494	312	211	80	29	10	37	41	2,282	0·1	
Bombay	374	545	680	771	636	509	353	277	149	157	328	737	5,516	0·2	...
Madras	1,196	1,556	2,641	2,359	2,211	1,620	1,550	1,103	800	865	922	1,265	18,088	0·4	0·4
Coorg	...	2	...	4	7	3	6	...	1	6	6	10	45	0·3	0·2
Assam	13	14	19	30	14	21	22	22	9	4	8	30	206		0·1
Burma	75	113	227	455	370	183	64	39	19	11	22	23	1,601	...	...
Ajmer-Merwara	11	11	37	75	102	66	32	18	2	3	7	74	438	0·1	0·1
														0·8	1·4

TABLE G.—DEATHS FROM FEVERS AND MALARIA IN RURAL AND URBAN AREAS.

	Fever deaths.			Death rate p. m.			Mean 1929-33.	Reported malaria deaths.			Death rate p. m.		
	R.	U.	Total.	R.	U.	Total.		R.	U.	Total.	R.	U.	Total.
British India	**3,761,695**	**195,382**	**3,957,077**	**15**	**7**	**14**	**15**	**1,532,336**	**46,256**	**1,578,592**	...	...	...
N.-W. F. P.	37,879	2,994	40,873	18	9	17	7	...	74*	74	...	...	...
Punjab	430,045	31,272	461,317	20	10	19	18	...	411†	411	...	...	...
Delhi	5,368	5,089	10,457	26	11	16	15	28	47	75	0·1	0·1	0·1
U. P.	916,560	53,729	970,289	20	14	19	18	853,477	19,579	873,056	18·3	5·0	17·3
B. & O.	659,459	10,930	670,389	18	8	17	17	...	...	...	...	...	...
Bengal	749,877	14,615	764,492	16	4	15	15	384,376	2,815	387,191	8·1	0·8	7·6
C. P.	281,381	20,738	302,119	19	12	19	18	266,455	18,562	285,017	18·4	10·6	17·6
Bombay	179,397	22,008	201,405	10	5	9	10	28,000	2,893	30,893	1·5	0·7	1·4
Madras	298,790	26,260	325,050	7	4	7	7	...	...	...	...	...	...
Coorg	2,738	63	2,801	18	7	17	19	...	...	...	...	...	...
Assam	100,736	1,043	101,779	13	5	12	12	...	271‡	271	...	...	...
Burma	89,556	4,611	94,167	8	3	8	7	...	1,604	1,604	...	...	...
Ajmer-Merwara	9,909	2,030	11,939	25	11	21	18	...	...	...	...	...	...

*Municipal towns only. †For 13 municipal towns in charge of whole-time health officers. ‡ In municipalities and small towns in which registration is compulsory.

TABLE H.—DEATHS FROM FEVERS BY MONTHS.

	Jan.	Feb.	Mar.	Apl.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.	Rate p. m. 1934.	Rate p. m. 1933.
British India	**314,337**	**274,774**	**302,459**	**343,517**	**344,534**	**314,572**	**304,875**	**334,321**	**344,175**	**359,941**	**356,604**	**362,968**	**3,957,077**	**14**	**13**
N.-W. F. P.	4,674	4,305	3,851	3,348	3,204	3,034	2,593	2,715	3,036	2,659	3,421	4,033	40,873	17	17
Punjab	42,681	36,493	36,540	36,675	41,303	38,318	31,707	31,634	35,740	40,522	41,541	48,163	461,317	19	19
Delhi	712	569	657	794	988	1,018	807	793	1,055	1,106	990	968	10,457	16	17
U. P.	56,273	56,005	66,270	87,574	93,482	92,465	82,690	84,167	85,467	93,447	85,879	86,570	970,289	19	14
B. & O.	46,496	41,984	45,629	57,990	60,751	53,261	54,351	64,776	65,975	63,705	58,579	56,892	670,389	17	15
Bengal	81,105	63,029	61,611	66,963	57,825	47,607	51,766	56,978	57,027	65,294	76,703	78,584	764,492	15	16
C. P.	18,736	17,813	23,541	28,216	27,327	25,769	20,676	27,647	32,776	31,727	26,201	21,690	302,119	19	15
Bombay	18,432	15,675	19,799	18,085	15,401	11,907	13,634	17,413	17,263	18,381	18,527	16,888	201,405	9	9
Madras	27,208	24,117	29,208	27,094	26,703	23,757	26,830	30,014	28,636	25,438	26,660	29,385	325,050	7	6
Coorg	166	178	233	268	262	287	321	290	223	200	186	187	2,801	17	19
Assam	8,823	7,280	6,956	8,013	9,963	10,127	9,976	8,026	8,247	7,878	7,620	8,670	101,779	12	13
Burma	8,123	6,372	6,970	7,407	6,520	6,313	8,900	8,863	7,691	8,446	9,038	9,524	94,167	8	7
Ajmer-Merwara	908	954	1,194	1,090	805	709	624	1,005	1,039	1,138	1,059	1,414	11,939	21	20

TABLE I.—DEATHS FROM DYSENTERY AND DIARRHŒA IN RURAL AND URBAN AREAS.

	Deaths.			Death rate p. m.			Mean 1929-33.	Deaths from dysentery.			Death rate p. m.		
	R.	U.	Total.	R.	U.	Total.		R.	U.	Total.	R.	U.	Total
British India	**228,867**	**56,243**	**285,110**	**0·9**	**2·1**	**1·0**	**0·9**	...	...	...	...	...	...
N.-W. F. P.	94	191	285	...	0·6	0·1	0·1	...	12†	...	...	...	...
Punjab	8,939	3,472	12,411	0·4	1·1	0·5	0·6	...	712*	...	...	...	...
Delhi	111	689	800	0·5	1·5	1·2	0·8	54	205	259	0·3	0·4	0·4
U. P.	6,421	11,719	18,140	0·1	3·0	0·4	0·3	4,151	3,588	7,739	0·1	0·9	0·2
B. & O.	22,030	1,451	23,481	0·6	1·0	0·6	0·5	...	...	...	...	...	...
Bengal	46,150	7,797	53,947	1·0	2·2	1·1	0·8	25,323	4,351	29,674	0·5	1·2	0·6
C. P.	33,339	4,736	38,075	2·3	2·7	2·3	2·1	6,041	672	6,713	0·4	0·4	0·4
Bombay	20,303	5,998	26,301	1·1	1·4	1·2	1·2	2,577	1,344	3,921	0·1	0·3	0·2
Madras	80,187	17,657	97,844	2·0	2·7	2·1	1·9	...	...	...	...	...	...
Coorg	141	36	177	0·9	3·8	1·1	0·8	86	25	111	0·6	2·6	0·7
Assam	7,892	303	8,195	1·0	1·5	1·0	1·1	...	184	...	...	...	...
Burma	3,258	1,773	5,031	0·3	1·2	0·4	0·5	...	807	...	...	...	...
Ajmer-Merwara	2	421	423	...	2·3	0·8	0·4	...	...	...	...	...	...

* For 13 municipal towns in charge of whole-time health officers. † Municipal towns only.

TABLE J.—DEATHS FROM DYSENTERY AND DIARRHŒA BY MONTHS.

	Jan.	Feb.	Mar.	Apl.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.	Rate p. m. 1934.	Rate p. m. 1933.
British India	**21,538**	**17,308**	**18,821**	**21,567**	**21,907**	**19,931**	**25,536**	**33,916**	**30,901**	**25,289**	**23,506**	**24,890**	**285,110**	**1·0**	**0·9**
N.-W. F. P.	21	16	19	18	35	21	21	20	22	25	31	36	285	0·1	0·1
Punjab	1,010	679	855	933	1,091	919	869	1,154	1,412	1,218	1,204	1,067	12,411	0·5	0·5
Delhi	45	25	42	56	57	64	77	131	128	81	44	50	800	1·2	0·9
U. P.	625	571	875	1,568	1,987	1,770	1,940	2,687	2,063	1,603	1,344	1,107	18,140	0·4	0·2
B. & O.	1,958	1,532	1,515	1,989	1,732	1,401	2,429	3,086	2,635	2,306	1,420	1,478	23,481	0·6	·4
Bengal	5,111	3,771	4,443	5,260	4,800	3,772	4,107	4,300	4,187	4,176	4,811	5,209	53,947	1·1	0·9
C. P.	1,583	1,373	1,786	2,491	2,204	1,964	3,136	6,435	6,689	4,850	3,134	2,430	38,075	2·3	1·4
Bombay	1,536	1,168	1,353	1,541	1,519	1,608	2,840	4,665	3,828	2,683	1,944	1,616	26,301	1·2	1·0
Madras	8,712	7,341	7,091	6,649	7,373	7,117	8,517	9,923	8,699	7,163	8,394	10,865	97,844	2·1	2·1
Coorg	10	7	24	11	19	24	21	13	20	15	11	2	177	1·1	0·7
Assam	623	571	534	682	660	750	754	731	668	720	815	687	8,195	1·0	1·1
Burma	284	240	250	312	388	491	790	709	502	409	327	329	5,031	0·4	0·4
Ajmer-Merwara.	20	14	34	57	42	30	35	62	48	40	27	14	423	0·8	0·7

TABLE K.—DEATHS FROM RESPIRATORY DISEASES IN RURAL AND URBAN AREAS.

	Deaths.			Death rate p.m.			Mean 1929-33.	Deaths from pulmonary tuberculosis.			Death rate p.m.		
	R.	U.	Total.	R.	U.	Total.		R.	U.	Total.	R.	U.	Total.
British India	**332,581**	**150,437**	**483,018**	**1·3**	**5·5**	**1·8**	**1·6**	...	...	...	...	...	...
N.-W. F. P.	1,732	1,419	3,151	0·8	4·4	1·3	1·0	...	70*	...	...	...	...
Punjab	41,808	13,762	55,570	2·0	4·2	2·8	2·8	...	1,547†	...	...	...	...
Delhi	1,406	3,074	4,480	6·8	6·7	6·7	7·2	73	403	476	0·4	0·9	0·7
U. P.	12,367	34,200	46,567	0·3	8·7	0·9	0·7	569	5,402	5,971	...	1·4	0·1
B. & O.	6,404	944	7,348	0·2	0·6	0·2	0·2	...	...	...	...	...	...
Bengal	67,143	17,970	85,113	1·4	5·1	1·7	1·3	10,928	3,917	14,845	0·2	1·1	0·3
C. P.	38,559	6,622	45,181	2·7	3·8	2·8	2·5	3,205	905	4,110	0·2	0·5	0·3
Bombay	71,230	35,338	106,568	3·9	8·2	4·7	4·8	15,843	7,406	23,249	0·9	1·7	1·0
Madras	81,537	26,205	107,742	2·0	4·1	2·3	2·2	...	...	...	...	...	...
Coorg	88	64	152	0·6	6·7	0·9	1·5	2	1	3	...	0·1	...
Assam	5,950	490	6,440	0·7	2·4	0·8	0·7	...	125	...	...	...	...
Burma	4,352	8,639	12,991	0·4	6·1	1·0	1·0	...	2,221	...	...	...	...
Ajmer-Merwara	5	1,710	1,715	...	9·5	3·0	1·3	...	...	...	...	...	...

TABLE L.—DEATHS FROM RESPIRATORY DISEASES BY MONTHS.

	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.	Rate p.m 1934.	Rate p.m 1933.
British India	**45,304**	**43,536**	**46,722**	**41,798**	**36,846**	**32,488**	**34,136**	**38,011**	**37,445**	**38,065**	**41,022**	**47,645**	**483,018**	**1·8**	**1·6**
N.-W. F. P.	426	412	368	252	258	193	137	157	184	209	237	318	3,151	**1·3**	1·1
Punjab	5,731	6,244	5,491	4,193	3,667	3,365	3,057	3,167	3,469	3,689	5,067	8,430	55,570	**2·3**	2·3
Delhi	449	399	408	418	343	280	294	357	255	269	412	596	4,480	**6·7**	6·8
U. P.	3,770	3,890	4,554	4,484	4,245	3,560	3,342	3,971	3,724	3,516	3,609	3,902	46,567	**0·9**	0·7
B. & O.	668	640	563	758	543	470	671	705	614	592	517	607	7,348	**0·2**	0·2
Bengal	8,634	8,023	8,552	8,471	6,535	5,142	5,741	5,815	5,683	6,218	7,625	8,674	85,113	**1·7**	1·6
C. P.	3,582	3,841	4,732	4,320	3,698	3,290	3,049	3,882	3,848	4,119	3,470	3,350	45,181	**2·8**	2·0
Bombay	10,047	9,695	11,142	8,836	7,388	6,176	7,240	8,874	9,111	9,102	9,098	9,859	106,568	**4·7**	4·5
Madras	10,178	8,606	9,034	8,281	8,593	8,441	8,849	9,183	8,734	8,576	9,235	10,032	107,742	**2·3**	2·3
Coorg	10	15	13	18	1	16	12	14	19	12	9	13	152	**0·9**	1·1
Assam	532	555	658	625	462	486	497	551	553	498	528	495	6,440	**0·8**	0·6
Burma	1,097	1,051	1,042	959	959	977	1,126	1,219	1,149	1,135	1,069	1,208	12,991	**1·0**	1·0
Ajmer-Merwara	180	165	165	183	154	92	121	116	102	130	146	161	1,715	**3·0**	2·7

*Municipal towns only.

†For 13 municipal towns in charge of whole-time health officers.

TABLE M.—QUININE AND CINCHONA FEBRIFUGE ISSUED BY THE PUBLIC HEALTH, MEDICAL, AND OTHER DEPARTMENTS IN THE VARIOUS PROVINCES DURING 1934.

Districts.	Quinine.		Cinchona febrifuge.	
	Total issues in lbs.	Grains per head of population.	Total issues in lbs.	Grains per head of population.
N.-W. F. P. (SETTLED DISTTS. ONLY).				
Peshawar	427	3	461	4
Hazara	60	1	98	1
D. I. Khan	124	3	113	3
Kohat	120	4	73	2
Bannu	159	5	40	1
Total	890	3	785	3
PUNJAB.				
Hissar	8	..	21	..
Rohtak	52	..	..	..
Gurgaon	9	..	15	..
Karnal	76	1	..	..
Ambala	29	..	66	1
Simla	..	..	..	..
Kangra	77	1	..	..
Hoshiarpur	100	1	..	..
Jullundur	42	..	..	..
Ludhiana	53	1	..	..
Ferozepore	15	..	..	..
Lahore	58	..	..	..
Amritsar	42	..	2	..
Gurdaspur	85	1	38	..
Sialkot	13	..	..	..
Gujranwala	54	1	..	..
Sheikhupura	30	..	14	..
Gujrat	44	..	..	..
Shahpur	9	..	..	..
Jhelum	18	..	..	..
Rawalpindi	47	1	..	..
Attock	32	..	1	..
Mianwali	23	..	..	..
Montgomery	93	1	..	..
Lyallpur	8	..	53	..
Jhang	22	..	..	..
Multan	20	..	..	..
Muzaffargarh	20	..	..	..
Dera Ghazi Khan	12	..	..	..
Total	*3,497	1	210	..
DELHI PROVINCE.				
Delhi	307	3	238	3

*Including 2,406 lbs. issued by the Medical Department of which details are not available.

TABLE M.– QUININE ISSUED BY PUBLIC HEALTH DEPARTMENTS, ETC.—*contd.*

Districts.	Quinine.		Cinchona febrifuge.	
	Total issues in lbs.	Grains per head of population.	Total issues in lbs.	Grains per head of population.
UNITED PROVINCES. *				
Dehra Dun	20	1	9	..
Saharanpur	128	1	123	1
Muzaffarnagar	85	1	25	..
Meerut	58	..	80	..
Bulandshahr	53	..	95	1
Aligarh	87	1	77	..
Muttra	56	1	128	1
Agra	99	1	115	1
Mainpuri	32	..	22	..
Etah	48	..	63	1
Bareilly	141	1	131	1
Bijnor	33	..	75	1
Budaun	34	..	37	..
Moradabad	64	..	129	1
Shahjahanpur	38	..	109	1
Pilibhit	52	1	90	1
Farrukhabad	56	..	67	1
Etawah	24	..	28	..
Cawnpore	50	..	42	..
Fatehpur	16	..	49	..
Allahabad	222	1	260	1
Banda	33	..	4	..
Hamirpur	28	..	37	1
Jhansi	107	1	112	1
Jalaun	27	..	24	..
Benares	45	..	98	1
Mirzapur	14	..	43	..
Jaunpur	25	..	32	..
Ghazipur	12	..	17	..
Ballia	12	..	15	..
Gorakhpur	171	..	324	1
Basti	35	..	161	1
Azamgarh	16	..	27	..
Naini Tal	222	6	494	12
Almora	16	..	12	..
Garhwal	30	..	35	..
Lucknow	132	1	155	1
Unao	28	..	88	1
Rae Bareli	30	..	94	1

*Quantities issued by the Public Health, Medical, Jail and other Departments.

TABLE M.—QUININE ISSUED BY PUBLIC HEALTH DEPARTMENTS, ETC.—*contd.*

Districts.	Quinine.		Cinchona febrifuge.	
	Total issues in lbs.	Grains per head of population.	Total issues in lbs.	Grains per head of population.
UNITED PROVINCES—*contd.*				
Sitapur	50	..	75	..
Hardoi	51	..	71	..
Kheri	76	1	131	1
Fyzabad	54	..	60	..
Gonda	122	1	129	1
Bahraich	61	..	94	1
Sultanpur	14	..	16	..
Partabgarh	25	..	40	..
Bara Banki	27	..	36	..
Total	2,859	..	4,178	1
BIHAR AND ORISSA.				
Patna	11	..		
Gaya	1	..		
Shahabad	22	..		
Saran	15	..		
Champaran	13	..		
Muzaffarpur	14	..		
Darbhanga	9	..		
Monghyr	8	..		
Bhagalpur	15	..		
Purnea	51	..		
Santal Parganas	25	..		
Cuttack	25	..		
Balasore	17	..		
Angul	6	..		
Puri	13	..		
Sambalpur	14	..		
Hazaribagh	14	..		
Ranchi	17	..		
Palamau	3	..		
Manbhum	17	..		
Singhbhum	17	..		
Total	340	..		

NOTE.—Quinine or Cinchona febrifuge was not distributed free.

TABLE M.—QUININE ISSUED BY PUBLIC HEALTH DEPARTMENTS, ETC.—*contd.*

Districts.	Quinine.		Cinchona febrifuge.	
	Total issues in lbs.	Grains per head of population.	Total issues in lbs.	Grains per head of population.
BENGAL PRESIDENCY (*Quantities issued by the Public Health Department only*).				
Mymensingh	1,201	2	..	..
Dacca	1,019	2	—	—
Tippera	893	2	..	—
Chittagong	775	3	..	..
Faridpur	730	2	..	..
Noakhali	501	2	—	—
Pabna	382	2	..	..
Jessore	317	1	..	—
Bakarganj	298	1	..	—
Rangpur	289	1	—	—
Khulna	286	1	..	—
Bogra	217	1	—	..
Nadia	213	1	..	—
Burdwan	212	1	..	..
Murshidabad	170	1	—	—
Midnapur	140	..	..	..
24-Parganas	137	..	..	—
Birbhum	130	1	..	—
Rajshahi	126	1	..	—
Bankura	117	1	..	..
Dinajpur	95	..	..	..
Hooghly	94	1	—	—
Calcutta	79	1	..	..
Malda	73	1	—	..
Jalpaiguri	60	..	..	..
Howrah	27	..	..	—
Darjeeling	11	..	..	—
Total	8,589	1	—	—
C. P. & BERAR.				
Nagpur	252	2	42	—
Wardha	33	..	24	..
Chanda	29	..	28	..
Chhindwara	81	1	41	—
Betul	92	2	23	—
Jubbulpore	66	1	50	—
Saugor	98	1	30	..
Mandla	59	1	28	..
Hoshangabad	111	1	52	—

TABLE M.—QUININE ISSUED BY PUBLIC HEALTH DEPARTMENTS, ETC. —*contd.*

Districts.	Quinine.		Cinchona febrifuge.	
	Total issues in lbs.	Grains per head of population.	Total issues in lbs.	Grains per head of population.
C. P. & BERAR—*contd.*				
Nimar	45	1	48	1
Raipur	156	1	43	..
Bilaspur	65	..	32	..
Drug	39	..	5	..
Bhandara	36	..	35	..
Balaghat	41	1	29	..
Amraoti	243	2	62	..
Yeotmal	81	1	27	..
Akola	174	1	36	..
Buldana	244	2	71	1
Total	1,945	1	706	..
BOMBAY PRESIDENCY.				
East Khandesh	42	--	..	..
West Khandesh	31	..	..	..
Surat	97	1	..	..
Broach	33	1	..	..
Kaira	92	1	..	..
Panch Mahals	28	..	..	..
Ahmedabad	281	2	..	..
Ahmednagar	19	..	..	..
Poona	250	2	..	..
Nasik	18	..	..	..
Thana	17	..	..	..
Bombay Suburban	7	--	..	..
Bombay City	5*	..	..	..
Kolaba	7	..	..	..
Ratnagiri	2	..	..	..
Belgaum	470	3	--	..
Dharwar	107	1	..	..
Bijapur	17	..	..	..
Kanara	55	1	..	..
Sholapur	26	..	..	..
Satara	148	1	..	..
Karachi	203	2	..	..
Dadu	61	1	--	..
Hyderabad	218	2	..	..
Nawabshah	117	2	..	..
Thar and Parkar	80	1	..	..
Larkana	214	3	..	..
Sukkur	307	3	..	..
Upper Sind Frontier	47	1	..	..
Total	2,999†	1	..	..

* The figs. relate to two jails.

† These represent free issues and exclude 7¼ lbs. issued free on railways. In addition, quinine hydrochloride treatments worth Rs. 7,805 was sold by the Public Health Department and quinine worth Rs. 30,892 was sold through Post Offices.

TABLE M.—QUININE ISSUED BY PUBLIC HEALTH DEPARTMENTS, ETC.—*contd.*

Districts.	Quinine.		Cinchona febrifuge.	
	Total issues in lbs.	Grains per head of population.	Total issues in lbs.	Grains per head of population.
MADRAS PRESIDENCY.*				
Anantapur	421	3	65	..
Bellary	379	4	112	1
Chingleput	41	..	..	..
Chittoor	72	..	..	..
Coimbatore	104	..	1	..
Cuddapah	120	1	23	..
Ganjam	112	..	..	..
Godavari	113	..	..	..
Guntur	75	..	..	..
Kistna	70	..	..	..
Kurnool	188	1	..	..
Madura	242	1	97	..
Madras	169	3	102	1
Malabar	161	1	108	..
Nellore	130	1	..	..
The Nilgiris	56	3	4	..
North Arcot	31	..	..	..
Ramnad	130	1	1	..
Salem	81	..	..	..
South Arcot	31	..	..	..
South Kanara	619	3	45	..
Tanjore	265	1	15	..
Tinnevelly	60	..	..	..
Trichinopoly	72	..	..	..
Vizagapatam	163	1	29	..
Total	3,905	1	602	..
COORG.				
Coorg	83	..	40	..
ASSAM.				
Cachar	74	1	143	2
Sylhet	216	1	270	1
Goalpara	66	1	16	..
Kamrup	223	2	158	1
Darrang	119	1	174	2
Nowgong	83	1	275	3
Sibsagar	7	..	25	..
Lakhimpur	92	1	58	1
K. & J. Hills	108	3	63	2
Garo Hills	56	2	19	1
Sadiya Frontier Tract	74	10	25	3
Naga Hills	63	2	69	3
Lushai Hills	49	3	83	5
Total	1,230	1	1,378	1

* The given figures show actual consumption.

TABLE M.—QUININE ISSUED BY PUBLIC HEALTH DEPARTMENTS, ETC.—*concld.*

Districts.	Quinine. Total issues in lbs.	Quinine. Grains per head of population.	Cinchona febrifuge. Total issues in lbs.	Cinchona febrifuge. Grains per head of population.
BURMA.				
Akyab	3	..	98	1
Kyaukpyu	3	..	11	..
Sandoway	..	..	2	..
Rangoon	5	..	..	..
Pegu	..	..	134	2
Tharrawaddy	4	..	37	1
Hanthawaddy	..	..	67	1
Insein	9	..	43	1
Prome	4	..	31	1
Bassein	9	..	68	1
Henzada	2	..	54	1
Myaungmya	5	..	38	..
Maubin	1	..	1	..
Pyapon	..	..	61	1
Thaton	19	..	31	..
Amherst	15	..	41	1
Tavoy	2	..	60	2
Mergui	..	..	92	4
Toungoo	7	..	119	2
Thayetmyo	5	..	13	..
Minbu	..	..	73	2
Magwe	2	..	5	..
Pakokku	..	..	16	..
Chin Hills	..	..	31	1
Mandalay	5	..	40	1
Kyaukse	..	..	18	1
Meiktila	..	..	5	..
Myingyan	2	..	..	..
Yamethin	1	..	16	..
Bhamo	1	..	232	13
Myitkyina	..	..	74	3
Shwebo	1	..	37	1
Sagaing	..	..	1	..
Katha	4	..	21	1
Upper Chindwin	..	..	12	..
Lower Chindwin	2	..	10	..
Northern Shan States	..	..	245	3
Southern Shan States	..	..	232	2
Total	111	1	2,069	1
Total including issues from the Medical Store Depôt	2,624	1	2,257	1
AJMER-MERWARA.				
Ajmer-Merwara	332	14	215	9

Appendix III

relating to

Section III.

TABLE A.—MATERNAL DEATH RATES PER 1,000 BIRTHS IN CERTAIN TOWNS.

	1934.		1933.	
	Deaths.	Rate p. m.	Deaths.	Rate p. m.
Delhi.				
Delhi City	87	6	104	7
Delhi Ntd. Area	27	34	27	31
United Provinces.				
Lucknow	177	14	119	10
Agra	71	6	68	5
Cawnpore	119	9	74	6
Allahabad	110	13	73	9
Benares	171	15	111	9
Moradabad	84	15	48	8
Aligarh	20	6	22	7
Bareilly	38	6	28	4
Saharanpur	61	15	30	8
Hathras	41	18	19	8
Muttra	29	10	32	10
Muzaffarnagar	8	6	12	7
Meerut	30	10	13	5
Jhansi	13	4	6	2
Central Provinces.				
Nagpur	111	11	80	8
Amraoti	64	27	48	20
Raipur	26	14	16	9
Burhanpur	32	14	33	16
Akola	64	33	40	21
Jubbulpore	44	8	27	8
Khamgaon	5	5	6	6
Bombay Presidency.				
Bombay City	249	7	233	8
Ahmedabad	188	12	204	12
Karachi	110	9	108	9
Surat	41	7	56	10
Sukkur	37	16	43	18
Shikarpur	38	17	67	29
Hyderabad	27	8	37	11
Poona	1,031	184	49	10
Larkana	21	25	18	24
Nasik	26	25	26	25
Sholapur	31	5	57	8
Satara	6	13	2	4
Ahmednagar	27	13	15	7

TABLE A.—MATERNAL DEATH RATES PER 1,000 BIRTHS IN CERTAIN TOWNS—*contd.*

	1934.		1933.	
	Deaths.	Rate p. m.	Deaths.	Rate p. m.
Madras Presidency.				
Chingleput	16	22	17	22
Tanjore	55	20	62	23
Guntur	86	32	73	28
Nellore	45	22	66	32
Negapatam	29	18	29	19
Nandyal	13	14	9	11
Anantapur	8	15	8	14
Mayavaram	16	18	3	3
Kurnool	15	9	32	20
Cuddapah	28	30	18	22
Kumbakonam	38	16	52	24
Tinnevelly	52	25	33	16
Cuddalore	31	15	42	20
Trichinopoly	68	15	63	13
Conjeeveram	34	13	33	13
Calicut	58	14	65	23
Rajahmundry	40	16	28	12
Palamcottah	38	19	27	13
Madura	117	18	107	16
Vellore	59	19	36	12
Cocanada	24	12	37	17
Tuticorin	37	15	22	9
Bezwada	50	18	33	12
Ellore	20	10	26	13
Madras	313	11	331	12
Burma.				
Mandalay	64	8	50	7
Moulmein	32	17	23	13
Rangoon Town	66	7	54	6
Myingyan	24	24	17	16
Akyab	13	18	9	12
Prome	13	12	14	12
Pegu	12	15	12	14
Coorg.				
Mercara	9	50	2	12

TABLE B.—MATERNITY AND CHILD WELFARE CENTRES IN RURAL AND URBAN AREAS.

	Centres maintained by								Trained visitors.		Trained midwives		Trained *dais*.	
	Govt.		Local and Municipal bodies.		Other Agencies.		Total.							
	R	U	R	U	R	U	R	U	R	U	R	U	R	U
Total .	13	7	233	193	91	147	337	347	31	205	1,058	1,129	2,245	1,683
N.-W. F. P. . . .	..	..	..	1	..	1	..	2	..	1	..	3	10	16
Punjab. . . .	..	..	22*	21*	18*	35*	40	56	15	48	1	14	155	558
Delhi	..	..	7	15	1	3	8	18	1	13	7	5	1	17
U. P.	..	..	109†	60	7	3	116	63	..	15	106	120	44	189
B. & O. . . .	..	6	..	5	4	8	4	19	..	7	4	19	..	7
Bengal‡ . . .	11	1	7	12	2	8	20	21	2	9	16	66	1,706	504
C. P.	..	..	..	7	11	39	11	46	6	42	6	2	19	194
Bombay	..	..	25	22	34	..	59	22	..	20	30	130	300	178
Madras. . . .	..	..	63	46	14	30	77	76	7	38	769	633	6	15
Coorg	..	..	..	..	..	1	..	1	..	..	..	..	3	..
Assam	..	..	..	..	..	3	..	3	..	2	3	9	1	5
Burma	2	..	..	4	..	16	2	20	..	10	116	128	..	..
Ajmer-Merwara . .	Not available.													

*Columns 3—6 include 32 sub-centres (branches of the main centres) in addition to 64 centres.
†Includes 13 sub-centres.
R = Rural.
U = Urban.
‡Urban figures exclude two towns.

Appendix IV

relating to

Section IV.

TABLE SHOWING THE DISTRIBUTION OF

	Rural Areas.									
	Medical Officers of Health.				Epidemic Staff.	Sanitary and Health Inspectors.	Vaccinators.		School Medical Officers.	Other Health Staffs.
	Holding D. P. H.		Licentiates (L. P. H. S.)				M.	F.		
	Whole time.	Part time.	Whole time.	Part time.						
Total	146	1	70	...	651	1,244	6,319	36	17	797
N.-W. F. P.	...	...	...	...	2*	...	24	...	...	*2
Punjab	28	...	...	...	60	48	483	...	...	14
Delhi	1 (I. M. S. A. D. P. H.)	1	...	...	...	2	3	... (S. A. S, Part time).	5	10 (Sanitary Assistants).
U. P.	41	...	30	...	43	131	821	...	...	...
B. & O.	13	...	15	...	162	76	1,178	1	10	132
Bengal†	28	...	8	...	199	574	1,813	32	...	540
C. P.	...	...	...	...	33	...	256	...	...	37
Bombay	2	...	2	...	97	5	377	...	1	48
Madras	30	...	15	...	18	322	653	3	1	12
Assam	...	...	...	...	15	...	411	...	...	...
Burma	3	...	...	...	22	86	300	...	...	2

† Urban figures exclude two towns.

*Appointments sanctioned for rural as well as

Health Staffs in Rural and Urban areas.

Urban Areas.

Medical Officers of Health.				Sanitary and Health Inspectors	Vaccinators.		Inspectors of Vaccination.	School Medical Officers.	Other Health Staffs.
Holding D. P. H.		Licentiates (L. P. H. S.)			M.	F.			
Whole time.	Part time.	Whole time.	Part time.						
124	8	98	19	990	927	27	97	59	667
1	...	...	...	8	8	1	*6	5	...
12	...	...	17	129	88	10	5	8	68
1	3 (Includes one I. M. S.)	...	...	12	8	...	...	3 (2 S. A. S. whole-time and 1 A. S. A. S. (Part-time).	8
20	...	13	...	165	185	...	...	13	...
9	3	...	...	65	72	1	20	...	53
19	...	5	2	103	134	5	4	4	75
2	...	1	...	61	68	...	...	...	5
20	...	47	...	129	61	2	2	10	237
25	...	28	...	181	178	8	19	13	88
1	...	...	...	14	29	...	41	...	97
14	2	4	...	123	96	...	...	3	36

urban areas of the province.

Appendix V

relating to

Section VI.

TABLE A.—VACCINATION STATISTICS FOR 1934-35.

Province.	Population.	Operations performed.			Percentage of success.		Children successfully vaccinated.		Total cost.	Average cost per successful case.	Rate of successful vaccinations per 1,000 of population.	Percentage of annual births successfully vaccinated.
		P	R	Total.	P.	R.	Under 1 year.	1 to 6 years.				
									Rs.	Rs. A. P.		
British India	269,694,709	10,128,115	13,141,109	23,269,224	96	46	4,084,309	4,128,994	33,46,172	0 3 11	51	44
N.-W. F. P.	3,762,678	142,543	114,192	256,735	98	84	74,861	48,778	26,919	0 1 11	59	103
Punjab	23,454,352	917,582	2,195,905	3,113,487	99	65	690,268	133,611	3,78,597	0 3 0	85	74
Delhi	636,246	18,547	15,338	33,885	97	63	13,560	2,749	7,438	0 4 10	38	55
U. P.	48,408,763	1,575,704	282,025	1,857,729	95	40	912,799	460,224	3,83,598	0 3 11	33	51
B. & O.	37,677,576	1,089,829	777,381	1,867,210	99	63	297,810	719,149	76,694	0 0 11	35	23
Bengal	50,114,002	2,635,546	4,260,825	6,896,371	86	40	289,696	1,510,464	4,49,249	0 1 9	80	20
C. P.	15,507,723	567,399	158,289	725,688	97	52	418,478	108,856	1,91,645	0 5 3	38	60
Bombay	21,855,300	733,844	482,991	1,216,835	100	46	481,052	189,753	5,42,265	0 11 2	35	62
Madras	45,204,545	1,381,176	3,842,744	5,223,920	96	27	642,825	498,161	7,26,400	0 5 9	44	39
Coorg	163,327	8,112	17,101	25,213	95	64	1,379	4,391	5,846	0 5 3	109	33
Assam	9,247,857	411,785	293,151	704,936	91	64	71,459	254,692	1,15,759	0 3 9	56	29
Burma	13,102,048	621,449	697,519	1,318,968	96	32	171,949	294,591	4,33,634	0 9 7	56	47
Ajmer-Merwara	560,292	24,599	3,648	28,247	96	94	18,238	3,575	3,128	0 4 9	48	94

P = Primary.
R = Revaccinations.

TABLE B.—VACCINATIONS PERFORMED IN THE BRITISH AND INDIAN ARMIES DURING 1934—OFFICERS AND OTHER RANKS.

Commands.	British Troops.							
	Officers.				Warrant, N. C. Officers and men.			
	Number.		Percentage of successful cases to total operations.		Number.		Percentage of successful cases to total operations.	
	P.	R.	P.	R.	P.	R.	P.	R.
Northern	1	81	100	95	2	3,079	50	86
Western	...	34	...	100	3	750	100	77
Eastern	4	95	75	83	23	3,267	74	55
Southern	...	119	...	64	6	4,102	83	61
Burma District	...	18	...	78	...	403	...	84
Total	5	347	80	81	34	11,601	76	68

Commands.	Indian Troops.											
	European officers.				Indian commissioned, non-commissioned officers and men.				Followers.			
	Number.		Percentage of successful cases to total operations.		Number.		Percentage of successful cases to total operations.		Number.		Percentage of successful cases to total operations.	
	P.	R.	P.	R.	P.	R.	P.	R.	P.	R.	P.	R.
Northern	...	127	...	94	235	14,746	88	88	50	3,691	100	84
Western	1	33	...	91	...	2,987	...	96	...	772	...	92
Eastern	...	53	...	72	548	10,038	84	79	9	1,684	78	68
Southern	4	86	100	66	72	7,866	97	66	23	2,731	100	58
Burma District	...	7	...	100	...	718	...	90	...	73	...	78
Total	5	306	80	82	855	36,355	86	81	82	8,951	98	73

P.—Primary. R.—Revaccinations.

TABLE B.—VACCINATIONS PERFORMED IN THE FAMILIES—BRITISH ARMY DURING 1934—*contd.*

Commands.	Women.				Children.			
	Number.		Percentage of successful cases to total operations.		Number.		Percentage of successful cases to total operations.	
	P.	R.	P.	R.	P.	R.	P.	R.
Northern . .	...	239	...	95	207	302	88	92
Western . .	...	51	...	78	52	56	100	80
Eastern . .	7	253	71	68	137	354	80	69
Southern . .	4	326	100	67	214	322	71	82
Burma District .	...	36	...	86	33	27	76	81
Total .	11	905	82	76	643	1,061	81	81

TABLE B.—VACCINATIONS PERFORMED IN THE FAMILIES—INDIAN ARMY DURING 1934—*concld.*

Commands.	Women.				Children.			
	Number.		Percentage of successful cases to total operations.		Number.		Percentage of successful cases to total operations.	
	P.	R.	P.	R.	P.	R.	P.	R.
Northern .	...	68	...	96	7	26	100	92
Western . .	...	10	...	80	4	6	100	100
Eastern . .	23	61	52	97	49	71	82	96
Southern . .	...	28	...	64	6	22	100	86
Burma District .	...	3	...	100	...	4	...	100
Total .	23	170	52	90	66	129	86	94

Appendix VI

relating to

Section VIII.

List of Scientific Papers by Research workers under the Government of India, the Indian Research Fund Association, Provincial Governments and Indian States published during 1934.

A.—(i) Papers published in the Indian Journal of Medical Research (I. J. M. R.) and its Memoirs.

Basir, M.A., and Reddy, D.V.S.

Structure and Significance of the Hypophysio-portal System. (Volume XXII, No. 1).

Basu, K. P., and Chakravarty, S.C.

Action of *B. coli* on conjugated Bile Acids. (Volume XXI, No. 4).

Basu, N. K.

Foundation of a Biochemical Method of Standardizing Vitamin D or Irradiated Ergosterol. (Volume XXII, No. 2).

Bhatia, B. B., and Lal, S.

The Pharmacological Action of Thevetoxin: A Second Glucoside from *Thevetia neriifolia.* (Volume XXI, No. 3).

On the Biological Assay of Digitalis by the Frog Method: describing a Characteristic Curve for *Rana tigrina.* (Volume XXII, No. 1).

Chopra, R. N., Chaudhury, S. G., and Gupta, J. C.

On Electrocardiograms. Part I. Blood-pressure and Electrocardiographic Changes with Muscle Extract. (Volume XXI, No. 3).

Chopra, R. N., and Chowhan, J. S.

Action of the Indian Daboia (*Vipera russellii*) Venom on the Circulatory System. (Volume XXI, No. 3).

Alangium lamarckii.—Its Chemistry and Pharmacological Action. (Volume XXI, No. 3).

Chopra, R. N., and De, Premankur.

A Preliminary Note on the Pharmacological Action of *Antiaris toxicaria.* (Volume XXI, No. 3).

Chopra, R. N., Mukherjee, S. N., and Sundar Rao, S.

Studies on the Protein Fractions of Blood Sera. Part I. Normal and Filarial Blood Sera. (Volume XXII, No. 1).

Chopra, R. N., Ghosh, N. N., and Mukerji, A. K.

Anthelmintic Properties of *Vernonia anthelmintica* Willd. (Syn. *Serratula anthelmintica*). (Volume XXII, No. 1).

Chopra, R. N., and Ghosh, S.

Some Common Indigenous Remedies. (Volume XXII, No. 2).

Chopra, R. N., Chowhan, J. S., and De, N.

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Appendix VII

relating to

Section X (Prisoners).

TABLE A.—SICKNESS

Statistics by

Administrations.*	Average strength.	Constantly sick.	Cholera. A.	Cholera. D.	Small-pox. A.	Small-pox. D.	Malaria. A.	Malaria. D.
India (excluding Andamans)	141,895	21	0·2	...	0·4	...	152	0·6
	145,437	22	...	...	0·4	...	172	0·6
	141,417	*23*	*0·1*	...	*0·4*	...	*169*	*0·5*
Andamans	5,759	27	...	...	...	...	260	1·7
	6,623	27	...	...	0·3	...	245	2·7
	7,363	*38*	...	...	*0·1*	...	*396*	*7·4*
India (including Andamans)	147,654	22	0·2	...	0·4	...	157	0·6
	152,060	22	...	...	0·4	...	175	0·7
	148,780	*24*	*0·1*	...	*0·3*	...	*180*	*0·9*
N.-W. F. P.	6,447	30	...	...	...	...	157	0·9
	6,927	35	...	...	0·7	...	258	0·4
	5,944	*31*	...	...	*0·2*	...	*227*	*0·6*
Punjab	19,957	22	...	...	0·3	...	274	1·4
	20,428	23	...	...	0·2	...	315	0·8
	19,817	*28*	*0·1*	...	*0·2*	...	*355*	*0·9*
U. P.	31,925	19	0·7	0·1	0·8	...	127	0·1
	33,346	20	...	...	0·6	...	128	0·3
	33,646	*20*	*0·2*	*0·1*	*0·6*	...	*144*	*0·4*
B. & O.	10,001	24	0·6	0·1	0·7	...	50	0·6
	11,469	25	...	...	0·4	0·1	68	0·5
	10,251	*27*	*0·2*	*0·1*	*0·6*	*0·1*	*104*	*0·3*
Bengal	19,271	38	0·2	0·1	0·3	...	269	1·2
	16,656	27	0·1	...	0·4	...	334	1·2
	15,316	*35*	*0·2*	...	*0·4*	*0·1*	*264*	*1·1*
C. P.	4,201	11	0·5	0·2	0·7	...	35	0·2
	4,308	10	...	...	0·2	...	43	0·5
	4,459	*12*	*0·2*	*0·1*	*0·2*	...	*49*	*0·7*
Bombay	12,143	22	...	...	...	...	317	0·3
	13,695	22	...	...	0·4	...	298	0·5
	13,559	*20*	*0·1*	...	*0·3*	...	*225*	*0·3*
Madras	11,640	15	...	...	0·1	...	18	0·2
	11,758	17	...	...	0·1	...	22	0·2
	13,008	*18*	...	...	*0·2*	...	*27*	*0·2*
Assam	4,007	22	...	...	...	...	111	0·7
	3,805	26	...	...	...	...	131	0·8
	3,102	*30*	...	...	*0·1*	...	*114*	*0·5*
Burma	20,239	10	0.1	...	0·4	...	12	0·2
	20,895	11	...	...	0·3	...	19	0·6
	20,257	*15*	...	...	*0·3*	...	*41*	*0·5*

A = Admissions.

D = Deaths.

NOTE.—The three figures against each administrative group
The rates have been calculated *per mille*

* Excluding subsidiary jails.

AND MORTALITY:

Administrations.

Tubercle of the lungs.		Pneumonia.		Respiratory diseases.		Dysentery.		Diarrhœa.		Anæmia and debility.		All causes.	
A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.
8	2·2	11	2·8	31	0·5	33	0·8	20	0·2	8	0·3	541	12
6	1·7	10	2·3	30	0·4	35	0·8	20	0·2	8	0·3	560	11
7	*2·0*	*12*	*2·5*	*29*	*0·4*	*40*	*1·1*	*21*	*0·3*	*9*	*0·4*	*587*	*12*
4	2·1	4	1·0	28	0·2	26	1·2	6	...	8	1·7	567	11
5	2·1	6	1·2	23	0·6	25	2·0	6	0·2	12	2·4	552	17
3	*2·0*	*6*	*2·4*	*21*	*0·4*	*20*	*5·0*	*11*	*0·3*	*10*	*3·2*	*753*	*31*
6	2·2	11	2·7	30	0·5	33	0·8	19	0·2	8	0·4	552	12
6	1·7	10	2·2	30	0·4	35	0·8	19	0·2	8	0·4	560	12
7	*2·0*	*11*	*2·5*	*29*	*0·4*	*39*	*1·2*	*20*	*0·3*	*9*	*0·5*	*595*	*13*
10	3·1	33	7·4	59	0·9	13	...	5	...	19	...	496	15
8	2·2	21	3·3	66	0·4	17	0·6	10	0·3	11	...	642	12
10	*2·6*	*28*	*4·5*	*59*	*0·4*	*13*	*0·2*	*11*	*0·1*	*7*	...	*600*	*13*
8	3·9	13	3·0	50	0·4	32	0·6	16	0·4	6	0·2	745	15
10	1·1	10	2·7	40	0·4	40	1·0	18	0·6	8	0·3	746	15
7	*2·5*	*13*	*3·6*	*47*	*0·5*	*29*	*0·4*	*21*	*0·6*	*15*	*0·2*	*859*	*14*
3	1·2	7	2·0	25	0·2	15	0·4	15	0·2	6	0·1	459	8
4	1·3	9	1·6	26	0·4	15	0·1	13	0·2	6	0·2	474	7
7	*1·2*	*12*	*2·4*	*23*	*0·4*	*21*	*0·4*	*12*	*0·2*	*6*	*0·2*	*480*	*9*
9	3·8	14	4·4	29	0·7	45	1·5	19	...	3	0·1	363	20
6	2·6	17	3·4	44	0·6	53	1·8	45	0·1	3	0·2	462	15
6	*2·8*	*14*	*2·6*	*37*	*0·5*	*71*	*1·7*	*46*	*0·3*	*1*	*0·1*	*516*	*15*
6	1·9	11	2·6	41	0·8	66	1·5	63	0·1	30	0·7	1,079	13
5	1·4	12	3·0	39	0·1	65	1·1	56	0·2	20	0·7	1,094	12
5	*1·6*	*12*	*2·3*	*34*	*0·4*	*58*	*1·4*	*55*	*0·2*	*18*	*0·5*	*993*	*12*
5	1·7	8	2·9	14	1·4	31	0·7	19	1·0	5	1·4	289	15
8	2·1	8	2·3	14	0·7	24	0·7	13	0·5	5	0·5	277	10
8	*1·7*	*8*	*1·9*	*14*	*0·9*	*58*	*1·4*	*14*	*0·4*	*3*	*0·4*	*320*	*12*
3	1·3	17	3·5	40	0·5	51	0·3	32	0·1	7	0·6	737	13
3	1·2	13	2·7	32	0·3	43	0·1	26	0·2	10	0·3	666	11
3	*1·1*	*16*	*3·0*	*33*	*0·3*	*54*	*0·4*	*31*	*0·2*	*8*	*0·3*	*623*	*10*
5	2·0	3	1·1	7	0·8	36	1·3	2	0·3	7	0·6	210	12
5	2·0	4	0·4	11	0·4	39	1·3	2	0·2	9	0·3	290	11
11	*2·0*	*5*	*1·1*	*14*	*0·4*	*47*	*0·8*	*1*	*0·1*	*8*	*0·3*	*321*	*10*
8	1·7	18	5·2	66	0·7	99	1·7	11	...	19	0·5	530	14
11	2·6	15	3·2	53	0·5	134	1·6	22	...	14	1·6	561	16
12	*3·8*	*12*	*3·1*	*52*	*0·6*	*128*	*3·4*	*27*	*0·2*	*12*	*1·2*	*597*	*18*
6	2·1	8	1·5	6	0·1	10	0·7	2	0·1	2	0·1	179	10
4	2·2	6	1·7	7	0·2	15	0·8	2	...	3	0·2	239	11
7	*3·2*	*6*	*1·7*	*10*	*0·3*	*29*	*2·7*	*5*	*0·2*	*8*	*0·8*	*399*	*16*

are those for (1) 1934, (2) 1933 and (3) 1929—33.
of average population.

TABLE B.—SICKNESS

Statistics by

Groups.*	Average strength.	Constantly sick.	Influenza. A.	Influenza. D.	Cholera. A.	Cholera. D.	Smallpox. A.	Smallpox. D.
India (excluding Andamans)	141,895	21	40	0·2	0 2	...	0·4	...
	145,437	22	31	0·1	...	...	0·4	...
	141,417	*23*	*37*	*0·2*	*0·1*	...	*0·4*	...
Andamans†	5,759	27	18	...	...	...	...	...
	6,623	27	14	...	...	...	0·3	...
	7,363	*38*	*4*	*0·1*	...	...	*0·1*	...
India (including Andamans)	147,654	22	39	0·2	0·2	...	0·4	...
	152,060	22	30	0·1	...	...	0·4	...
	148,780	*24*	*35*	*0·2*	*0·1*	...	*0·3*	...
Group I.—Burma Coast and Bay Islands	14,539	10	22	0·1	0·1	...	0·1	...
	14,700	10	19	...	...	...	0·3	...
	13,903	*16*	*43*	...	...	...	*0·2*	...
Group II.—Burma Inland	5,700	9	3	...	0·2	...	1·2	...
	6,195	13	11	...	...	...	0·3	0·2
	6,355	*13*	*13*	*0·1*	...	...	*0·4*	...
Group III.—Assam	3,896	22	25	0·3	...	...	...	...
	3,678	26	24	1·1	...	...	...	...
	2,996	*30*	*45*	*0·3*	...	...	*0·1*	...
Group IV.—Bengal & Orissa	20,358	39	114	0·3	0·2	...	0·4	...
	17,559	37	101	0·3	0·1	...	0·3	...
	16,137	*35*	*86*	*0·3*	*0·2*	...	*0·4*	*0·1*
Group V.—Gangetic Plain and Chota-Nagpur.	29,719	21	39	0·3	0·8	0·1	0·9	...
	32,423	23	31	0·2	...	...	0·7	...
	31,339	*24*	*36*	*0·3*	*0·1*	*0·1*	*0·7*	...
Group VI.—Upper Sub-Himalaya	18,290	22	26	0·1	0·2	0·1	0·1	0·1
	19,405	19	7	...	...	...	0·1	...
	19,734	*21*	*18*	*0·2*	*0·2*	*0·1*	*0·3*	...
Group VII.—North-West Frontier, Indus Valley and North-Western Rajputana.	19,962	22	13	...	...	...	0·3	...
	20,106	29	3	...	...	...	0·5	...
	18,423	*30*	*21*	*0·2*	*0·1*	...	*0·2*	...
Group VIII.—South Western Rajputana, Central India & Gujarat.	5,332	14	20	...	..	...	...	...
	5,584	12	24	...	0·5	..	...	...
	5,578	*12*	*37*	...	*0·3*	...	*0·3*	...
Group IX.—Deccan	9,860	18	39	0·4	0·2	0·1	0·3	...
	11,139	17	24	...	...	...	0·1	...
	11,114	*17*	*21*	*0·1*	*0·2*	*0·1*	*0·2*	...
Group X.—Western Coast	2,112	23	48	...	...	...	...	...
	2,553	18	20	...	...	...	1·2	...
	2,570	*17*	*21*	*0·1*	...	...	*0·4*	...
Group XI.—Southern India	10,899	14	39	0·2	...	...	0·1	...
	10,863	17	61	0·1	...	...	...	...
	12,159	*19*	*48*	*0·2*	...	...	*0·2*	...
Group XII.—Hills	1,174	48	25	...	...	...	...	...
	1,171	49	28	0·9	...	...	...	...
	1,037	*38*	*52*	*0·8*	...	...	*0·2*	...

A = Admissions.
D = Deaths.

NOTE.—The three figures opposite each administrative group The rates have been calculated *per mille*

* Excluding subsidiary jails.

ND MORTALITY.

Geographical Groups.

Enteric fever.		Malaria.		Pyrexia of uncertain origin.		Pneumonia.		Dysentery.		Diarrhœa.		All causes.	
A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.
2	0·3	152	0·6	8	...	11	2·8	33	0·8	20	0·2	541	12
2	0·3	172	0·6	9	..	10	2·3	35	0·8	20	0·2	566	11
2	*0·3*	*169*	*0·5*	*12*	...	*12*	*2·5*	*40*	*1·1*	*21*	*0·3*	*587*	*12*
2	0·4	260	1·7	...	...	4	1·0	26	1·2	6	...	567	11
1	...	245	2·7	...	...	6	1·2	25	2·0	6	0·2	552	18
1	*0·1*	*396*	*7·4*	...	...	*6*	*2·4*	*20*	*5·0*	*11*	*0·3*	*753*	***31***
2	0·3	157	0·6	8	...	11	2·7	33	0·8	19	0·2	552	12
2	0·2	175	0·7	9	...	10	2·2	35	0·8	19	0·2	560	12
2	*0·3*	*180*	*0·9*	*11*	...	*11*	*2·5*	*39*	*1·2*	*20*	*0·3*	*595*	***13***
2	0·1	9	0·1	7	...	7	0·1	9	0·4	3	0·1	176	9
1	0·2	14	0·3	9	0·1	5	1·2	14	0·9	2	0·1	222	10
4	*0·4*	*37*	*0·3*	*14*	...	*5*	*1·6*	*30*	*2·5*	*6*	*0·2*	*421*	*15*
2	0·5	20	0·7	11	...	12	2·3	11	1·4	1	0·2	186	12
2	0·3	29	1·3	5	...	10	2·9	16	0·5	1	...	282	13
3	*0·5*	*41*	*0·9*	*10*	...	*8*	*2·0*	*29*	*3·1*	*5*	*0·2*	*350*	*18*
3	0·5	110	0·8	2	...	18	5·4	100	1·8	11	...	530	15
1	...	130	0·8	1	...	15	3·3	134	1·4	18	...	542	16
1	*0·1*	*112*	*0·5*	*8*	*0·1*	*12*	*3·2*	*130*	*3·4*	*25*	*0·2*	*587*	*18*
1	0·4	262	1·2	25	...	12	3·0	67	1·7	62	0·1	1,061	14
1	0·5	328	1·1	18	...	13	3·2	64	1·2	54	0·2	1,072	13
2	*0·3*	*266*	*1·1*	*38*	...	*12*	*2·4*	*58*	*1·5*	*54*	*0·2*	*981*	*17*
1	0·2	97	0·2	6	...	9	2·5	23	0·6	17	0·1	413	11
3	0·2	92	0·4	10	...	10	2·2	27	0·6	24	0·2	468	9
2	*0·3*	*124*	*0·4*	*7*	...	*12*	*2·4*	*36*	*0·7*	*22*	*0·2*	*485*	*11*
2	0·2	258	0·8	11	...	10	2·5	27	0·5	17	0·1	717	10
2	0·2	287	0·6	8	0·1	11	2·4	32	0·9	18	0·5	695	12
2	*0·2*	*317*	*0·7*	*13*	*0·1*	*14*	*3·6*	*29*	*0·4*	*18*	*0·6*	*730*	*10*
3	0·5	246	1·2	3	...	25	5·6	35	0·5	15	0·3	651	17
6	0·6	304	0·8	16	...	18	3·7	34	0·5	15	0·4	710	15
4	*0·4*	*278*	*0·7*	*6*	...	*23*	*4·5*	*28*	*0·4*	*17*	*0·4*	*711*	*15*
1	0·6	187	0·4	2	...	13	2·3	29	0·6	9	0·4	432	9
3	0·2	132	0·2	2	0·2	12	1·6	13	0·2	7	...	331	6
2	*0·1*	*137*	*0·4*	*1*	...	*12*	*2·4*	*20*	*0·5*	*18*	*0·3*	*418*	*8*
1	0·1	141	0·2	5	0·1	6	1·8	25	0·3	27	0·5	487	11
1	...	198	0·3	6	...	6	1·4	29	0·4	25	0·2	516	8
2	*0·1*	*134*	*0·4*	*10*	...	*6*	*1·1*	*58*	*0·8*	*27*	*0·2*	*478*	*8*
3	0·5	169	0·5	...	...	2	...	91	1·9	24	...	617	8
3	...	106	...	2	...	2	...	86	1·2	24	...	537	7
4	*0·2*	*136*	*0·2*	*1*	...	*4*	*1·1*	*83*	*1·1*	*28*	*0·1*	*521*	*8*
...	...	19	0·2	1	...	3	1·2	27	1·0	2	0·3	200	12
2	...	23	0·2	1	...	4	0·5	33	1·2	2	0·2	282	11
3	*0·3*	*29*	*0·2*	*3*	...	*5*	*1·1*	*46*	*0·8*	*1*	*0·1*	*328*	*10*
3	1·7	121	...	2	...	12	3·4	15	...	8	...	422	20
...	...	227	0·9	3	...	10	1·7	24	0·9	23	0·9	565	18
1	*0·4*	*183*	*0·2*	*14*	...	*20*	*2·1*	*36*	*0·2*	*18*	*0·6*	*610*	*20*

are those for (1) 1934, (2) 1933 and (3) 1929—33.
of average population.

TABLE C.—CAUSES OF ADMISSION.*

	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total.
Cholera	...	...	2	2	1	2	20	4	...	2	1	1	35
	1	2	...	...	...	1	...	...	1	...	...	...	5
	...	...	*1*	*1*	*2*	*1*	*2*	*5*	*1*	*1*	*1*	...	*15*
Smallpox	4	5	8	6	11	12	2	2	...	...	2	2	54
	7	6	9	9	7	5	2	2	1	...	4	2	54
						Not available.							*51*
Dysentery	327	169	330	355	335	362	736	625	442	383	382	300	4,746
	277	282	362	322	377	405	501	550	535	567	521	422	5,121
	306	*262*	*328*	*387*	*412*	*418*	*640*	*795*	*695*	*584*	*491*	*406*	*5,724*
Diarrhœa	134	147	279	234	267	255	452	343	228	174	165	156	2,834
	160	186	291	214	253	262	303	320	233	255	248	173	2,898
	155	*162*	*264*	*241*	*229*	*258*	*343*	*374*	*266*	*229*	*211*	*180*	*2,912*
Enteric fever	10	17	18	30	20	18	29	37	21	18	12	13	243
	19	18	25	42	37	37	28	35	37	26	20	7	331
	13	*16*	*25*	*31*	*34*	*28*	*34*	*41*	*44*	*34*	*26*	*12*	*338*
Malaria	1,452	1,133	1,405	1,387	1,437	1,409	1,929	2,085	2,562	2,979	2,367	1,477	21,622
	1,223	920	1,303	1,350	1,419	1,466	1,937	2,313	2,861	4,349	3,578	2,299	25,018
	1,259	*973*	*1,143*	*1,267*	*1,358*	*1,378*	*1,842*	*2,420*	*3,002*	*3,879*	*3,256*	*2,063*	*23,840*
Pyrexia of uncertain origin.	61	51	78	140	126	117	106	106	69	76	108	94	1,132
	88	90	104	146	120	86	115	120	170	128	99	77	1,343
	96	*75*	*117*	*121*	*134*	*165*	*197*	*183*	*170*	*164*	*132*	*93*	*1,647*
Pneumonia	201	195	173	131	114	100	84	94	81	110	137	194	1,614
	205	119	126	113	100	78	101	88	87	122	173	192	1,504
						Not available.							*1,634*
Tubercle of the lungs.	64	63	52	68	88	65	84	75	85	76	64	47	831
	70	73	57	66	76	64	67	130	69	50	46	47	815
						Not available.							*972*

NOTE.—The three figures shown against each disease are those for (1) 1934, (2) 1933 and (3) mean of 1929—38,

* Excluding Andamans.

TABLE D.—*SICKNESS AND MORTALITY FROM PRINCIPAL DISEASES.

Year.	Average annual strength.	Influenza. Actuals. A.	Influenza. Actuals. D.	Influenza. Rates. A.	Influenza. Rates. D.	Cholera. Actuals. A.	Cholera. Actuals. D.	Cholera. Rates. A.	Cholera. Rates. D.	Smallpox. Actuals. A.	Smallpox. Actuals. D.	Smallpox. Rates. A.	Smallpox. Rates. D.	Enteric fever. Actuals. A.	Enteric fever. Actuals. D.	Enteric fever. Rates. A.	Enteric fever. Rates. D.
1934	141,895	5,667	26	40	0·2	35	7	0·2	...	54	1	0·4	...	243	41	2	0·3
1933	145,437	4,536	18	31	0·1	5	...	...	...	54	2	0·4	...	331	38	2	0·3
Mean 1929—33	*141,417*	*5,217*	*28*	*37*	*0·2*	*15*	*5*	*0·1*	...	*51*	*3*	*0·4*	...	*338*	*42*	*2*	*0·3*

Year.	Average annual strength.	Malaria. Actuals. A.	Malaria. Actuals. D.	Malaria. Rates. A.	Malaria. Rates. D.	Pyrexia of uncertain origin. Actuals. A.	Pyrexia of uncertain origin. Actuals. D.	Pyrexia of uncertain origin. Rates. A.	Pyrexia of uncertain origin. Rates. D.	Tubercle of the lungs. Actuals. A.	Tubercle of the lungs. Actuals. D.	Tubercle of the lungs. Rates. A.	Tubercle of the lungs. Rates. D.	Pneumonia. Actuals. A.	Pneumonia. Actuals. D.	Pneumonia. Rates. A.	Pneumonia. Rates. D.
1934	141,895	21,622	82	152	0·6	1,132	2	8	...	831	308	6	2·2	1,614	392	11	2·8
1933	145,437	25,018	83	172	0·6	1,343	4	9	...	815	241	6	1·7	1,504	328	10	2·3
Mean 1929—33	*141,417*	*23,840*	*77*	*169*	*0·5*	*1,647*	*5*	*12*	...	*972*	*286*	*7*	*2·0*	*1,634*	*357*	*12*	*2·5*

Year.	Average annual strength.	Respiratory Diseases. Actuals. A.	Respiratory Diseases. Actuals. D.	Respiratory Diseases. Rates. A.	Respiratory Diseases. Rates. D.	Dysentery. Actuals. A.	Dysentery. Actuals. D.	Dysentery. Rates. A.	Dysentery. Rates. D.	Diarrhœa. Actuals. A.	Diarrhœa. Actuals. D.	Diarrhœa. Rates. A.	Diarrhœa. Rates. D.	Anæmia and Debility. Actuals. A.	Anæmia and Debility. Actuals. D.	Anæmia and Debility. Rates. A.	Anæmia and Debility. Rates. D.
1934	141,895	4,329	70	31	0·5	4,746	112	33	0·8	2,834	25	20	0·2	1,089	46	8	0·3
1933	145,437	4,357	53	30	0·4	5,121	111	35	0·8	2,898	34	20	0·2	1,179	50	8	0·3
Mean 1929—33	*141,417*	*4,113*	*60*	*29*	*0·4*	*5,724*	*150*	*40*	*1·1*	*2,912*	*37*	*21*	*0·3*	*1,299*	*50*	*9*	*0·4*

NOTE.—Rates have been calculated *per mille* of average population. * Excluding Andamans. A = Admissions. D = Deaths.

Table E.—Sickness Statistics of Convicts only.

		1930			1931			1932			1933			1934		
		Average population.	Rate per 1,000.		Average population.	Rate per 1,000.		Average population.	Rate per 1,000.		Average population.	Rate per 1,000.		Average population.	Rate per 1,000.	
			A.	D.		A.	D.		A.	D.		A.	D.		A.	D.
Total	C.	64,554	576	13	66,066	506	12	76,799	482	10	71,222	434	11	70,108	411	12
	D.	63,097	667	12	40,199	680	14	58,752	737	12	53,671	801	12	52,462	721	13
N.-W. F. P.	C.	3,764	605	18	3,959	439	8	6,359	734	11	5,538	687	11	5,100	512	14
	D.	572	902	21	637	730	41	630	797	18	670	457	22	671	383	27
Punjab	C.	8,359	975	13	9,051	828	15	9,558	722	17	8,943	679	17	8,938	626	16
	D.	8,635	1,032	16	7,865	1,143	13	8,519	962	10	8,614	934	16	8,566	950	15
U. P.	C.	11,789	241	4	12,189	360	8	13,115	356	8	12,477	318	5	12,056	300	7
	D.	16,417	562	8	14,246	675	13	17,939	675	10	16,042	577	7	14,976	561	9
B. & O.	C.	4,784	246	20	4,876	337	24	5,230	257	12	5,866	211	15	5,799	241	22
	D.	6,222	667	8	3,952	818	16	5,753	1,098	14	4,739	771	17	3,300	539	19
Bengal	C.	7,111	900	9	6,891	872	11	7,399	1,017	12	7,551	909	12	8,261	907	13
	D.	9,051	958	11	5,449	1,089	15	5,968	1,222	14	6,295	1,286	14	8,377	1,249	15
C. P.	C.	2,111	421	9	2,058	180	12	2,214	265	6	1,830	104	6	1,830	135	9
	D.	2,295	418	9	1,682	599	23	2,289	426	8	1,992	437	16	2,294	435	17
Bombay	C.	7,776	724	9	6,546	590	8	8,755	519	6	7,001	511	11	6,670	603	12
	D.	6,686	604	10	5,143	560	16	6,725	585	9	5,827	887	12	4,654	958	15
Madras	C.	10,427	605	18	9,372	373	10	10,018	273	8	8,849	271	12	8,726	184	13
	D.	3,343	902	21	11,669	396	10	2,306	447	11	2,045	367	7	2,045	304	11
Assam	C.	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	D.	2,370	536	16	2,606	630	22	3,140	596	21	3,143	551	18	3,354	531	16
Burma	C.	10,433	555	21	11,124	397	13	14,151	364	11	13,167	214	12	12,728	174	10
	D.	7,506	375	16	5,875	243	12	5,483	262	15	4,304	273	12	4,225	180	12

C = Central Jails.
D = District Jails.

A = Admission Rates.
D = Death Rates.

TABLE F.—SICKNESS STATISTICS OF CONVICTS ONLY ARRANGED ACCORDING TO DURATION OF CONFINEMENT.

			Not exceeding six months.	Above six months and not exceeding one year.	Above one year and not exceeding two years.	Above two years and not exceeding three years.	Above three years and not exceeding seven years.	Above seven years.	Total.
1930	District Jails	Average Popn.	30,071	12,642	9,224	5,353	3,430	1,227	61,947
		Deaths	308	127	128	60	68	36	727
		Rate per 1,000	10	10	14	11	20	29	12
	Central Jails	Average Popn.	17,179	12,116	11,403	8,911	8,815	9,085	67,509
		Deaths	224	114	154	106	170	100	868
		Rate per 1,000	13	9	14	12	19	11	13
1931	District Jails	Average Popn.	21,990	11,453	8,166	5,174	2,837	1,106	50,726
		Deaths	338	147	124	44	57	21	731
		Rate per 1,000	15	13	15	9	20	18	14
	Central Jails	Average Popn.	15,092	11,604	10,587	8,834	8,917	8,762	63,796
		Deaths	229	106	132	80	142	83	772
		Rate per 1,000	15	9	13	9	16	10	12
1932	District Jails	Average Popn.	26,794	13,931	8,277	4,822	2,774	1,093	57,691
		Deaths	335	136	91	44	48	25	679
		Rate per 1,000	13	10	11	9	17	23	12
	Central Jails	Average Popn.	19,316	13,891	11,898	10,503	9,900	9,381	74,889
		Deaths	234	138	133	76	111	74	766
		Rate per 1,000	12	10	11	7	11	8	10
1933	District Jails	Average Popn.	21,188	13,762	8,601	5,164	2,984	1,007	52,706
		Deaths	295	153	104	50	42	16	660
		Rate per 1,000	14	11	12	10	14	16	13
	Central Jails	Average Popn.	14,424	11,394	12,278	10,067	9,444	9,343	66,950
		Deaths	222	128	158	72	143	75	798
		Rate per 1,000	13	11	13	7	15	8	11
1934	**District Jails**	**Average Popn.**	**19,804**	**11,874**	**8,870**	**5,500**	**3,220**	**809**	**50,077**
		Deaths	**340**	**140**	**97**	**63**	**48**	**14**	**702**
		Rate per 1,000	**17**	**12**	**11**	**11**	**15**	**17**	**14**
	Central Jails	**Average Popn.**	**12,811**	**11,278**	**11,516**	**10,495**	**10,418**	**9,805**	**66,323**
		Deaths	**240**	**115**	**186**	**118**	**136**	**78**	**873**
		Rate per 1,000	**19**	**10**	**16**	**11**	**13**	**8**	**13**

TABLE G.—ADMISSION AND DEATH RATES *PER MILLE* OF AVERAGE STRENGTH.

	N.-W. F. P.	Punjab.	U. P.	B. & O.	Bengal.	C. P.	Bombay.	Madras.	Assam.	Burma.	India.*	Andamans.	India.†
I.—Average Annual Strength.	6,447	19,957	31,925	10,001	19,271	4,201	12,143	11,640	4,007	20,239	141,895	5,759	147,654
II.—Constantly Sick Rate—													
(*a*) Excluding subsidiary jails and lock-ups.	30	22	19	24	38	11	22	15	22	10	21	27	22
(*b*) Including subsidiary jails and lock-ups.	30	21	19	23	36	11	20	14	22	10	21	27	21
III.—Admission Rate—													
All causes—													
(*a*) Excluding subsidiary jails and lock-ups.	496	745	459	363	1,079	289	737	210	530	179	541	567	552
(*b*) Including subsidiary jails and lock-ups.	497	736	459	422	1,062	291	734	262	530	179	555	567	555
Influenza	23	16	38	35	116	57	18	38	27	17	40	18	39
Cholera	...	...	1	1	...	1	...	...	...	...	...	...	...
Smallpox	...	...	1	1	...	1	...	...	...	...	...	...	...
Enteric fever	5	2	1	3	2	1	1	1	3	2	2	2	2
Malaria	157	274	127	50	269	35	317	18	111	12	152	260	157
Sandfly fever	...	11	5	...	...	...	...	...	...	...	3	...	3
Pyrexia of uncertain origin.	3	7	9	1	22	12	...	1	1	8	8	...	8
Tubercle of the lungs	10	8	3	9	6	5	3	5	8	6	6	4	6
Pneumonia	33	13	7	14	11	8	17	3	18	8	11	4	11
Respiratory diseases	59	50	25	29	41	14	40	7	66	6	31	28	30
Dysentery	13	32	15	45	66	31	51	36	99	10	33	26	33
Diarrhœa	5	16	15	19	63	19	32	2	11	2	20	6	19
Spleen diseases	...	1	1	...	...	...	1	...	...	...	...	...	...
Scurvy	...	...	...	...	...	...	1	...	...	...	...	...	...
Anæmia and debility	19	6	6	3	30	5	7	7	19	2	8	8	8
Abscess, ulcer and boil	31	56	50	14	53	9	37	6	18	9	35	23	35
IV.—Death Rate—													
All causes—													
(*a*) Excluding subsidiary jails and lock-ups.	15	15	8	20	13	15	13	12	14	10	12	11	12
(*b*) Including subsidiary jails and lock-ups.	15	14	8	18	13	15	12	11	14	10	12	11	12
Cholera	...	...	...	...	...	...	...	...	...	...	...	...	...
Smallpox	...	...	...	...	...	...	...	...	...	...	..	...	...
Enteric fever	1	...	...	...	...	...	...	...	...	...	...	...	...
Malaria	1	1	...	1	1	...	...	...	1	...	1	2	1
Sandfly fever	...	...	...	...	...	...	...	...	...	...	...	...	...
Pyrexia of uncertain origin.	...	...	...	...	...	...	...	...	...	...	...	...	...
Tubercle of the lungs	3	4	1	4	2	2	1	2	2	2	2	2	2
Pneumonia	7	3	2	4	3	3	4	1	5	2	3	1	3
Respiratory diseases	1	...	...	1	1	1	1	1	1	...	1	...	1
Dysentery	...	1	...	2	2	1	...	1	2	1	1	1	1
Diarrhœa	...	...	...	...	...	1	...	...	...	...	...	...	...
Hepatic abscess	...	...	...	...	...	...	...	...	...	...	...	...	...
Anæmia and debility	...	...	...	...	1	1	1	1	1	...	...	2	...
Phagadæna, slough and gangrene.	...	...	...	...	...	...	...	...	...	...	...	...	...

*Excluding Andamans.

†Including Andamans.

TABLE H.—ADSSIONS BY MONTHS FROM CHOLERA, SMALLPOX, ENTERIC FEVER, MALARIA, PYREXIA OF UNCERTAIN ORIGIN, TUBERCULOSIS OF THE LUNGS, PNEUMONIA, DYSENTERY AND DIARRHŒA.

CHOLERA.

	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.
India	...	...	2	2	1	2	20	4	...	2	1	1	35
N.-W. F. P.	...	...	...	...	...	...	...	...	...	...	...	...	...
Punjab	...	...	...	...	...	...	...	...	...	...	...	...	...
U. P.	...	...	1	...	...	...	18	2	...	...	...	...	21
B. & O.	...	...	...	1	1	2	1	1	...	...	...	...	6
Bengal	...	...	1	...	...	...	...	...	...	2	1	...	4
C. P.	...	...	...	...	...	...	1	1	...	...	...	...	2
Bombay							...						
Madras	...	...	...	...	...	...	...	...	...	...	...	...	...
Assam	...	...	...	...	...	...	...	...	...	...	...	...	...
Burma	...	...	...	1	...	...	...	...	...	...	...	1	2
Andamans	...	...	...	...	...	...	...	...	...	...	...	...	...

SMALLPOX.

India	4	5	8	6	11	12	2	2	...	...	2	2	54
N.-W. F. P.	...	...	...	...	...	...	...	...	...	...	...	...	...
Punjab	1	2	...	...	...	...	...	...	...	...	...	2	5
U. P.	1	1	2	3	4	11	1	...	...	...	1	...	24
B. & O.	1	2	2	...	2	...	...	...	...	...	...	...	7
Bengal	...	...	...	...	2	...	1	2	...	...	...	...	5
C. P.	1	...	...	2	...	...	...	...	...	...	...	...	3
Bombay													
Madras	...	...	...	...	...	...	...	...	...	...	...	...	...
Assam	...	...	1	...	...	...	...	...	...	...	...	...	1
Burma	...	...	3	1	3	1	...	...	...	...	1	...	9
Andamans	...	...	...	...	...	...	...	...	...	...	...	...	...

ENTERIC FEVER.

India	10	17	19	31	20	18	29	40	22	22	15	13	256
N.-W. F. P.	1	2	...	3	6	3	7	6	2	...	...	...	30
Punjab	...	1	2	8	6	6	4	9	4	3	1	3	47
U. P.	1	1	3	6	2	1	2	2	...	3	...	2	23
B. & O.	...	2		4	2	2	4	5	1	3	1	...	26
Bengal	2	...	2	4	1	2	6	4	4	2	1	2	30
C. P.	...	...		...	...	...	1	1	1	...	...	...	3
Bombay	...	1	...	...	2	...	1	3	3	1	4	1	16
Madras	...	...	1	...	...	...	...	1	1	2	1	...	6
Assam	1	2	4	...	...	...	2	...	...	...	1	2	12
Burma	5	6	3	3	1	3	2	5	2	2	3	3	38
Andamans	...	...	1	1	...	...	...	3	1	4	3	...	13

TABLE H.—ADMISSIONS BY MONTHS FROM CHOLERA, SMALLPOX, ENTERIC FEVER, MALARIA, PYREXIA OF UNCERTAIN ORIGIN, TUBERCULOSIS OF THE LUNGS, PNEUMONIA, DYSENTERY AND DIARRHŒA—*contd.*

	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.
MALARIA.													
India	1,522	1,185	1,503	1,536	1,589	1,597	2,152	2,237	2,667	3,099	2,476	1,556	23,119
N.-W. F. P.	66	53	74	87	73	104	140	90	100	95	71	59	1,012
Punjab	320	247	229	276	451	364	523	548	910	721	545	332	5,466
U. P.	183	118	209	219	205	195	319	491	609	852	426	230	4,056
B. & O.	41	27	48	57	55	42	45	54	33	38	41	19	500
Bengal	376	298	425	399	376	361	472	451	382	630	584	421	5,175
C. P.	11	16	5	10	2	2	15	11	15	22	28	10	147
Bombay	367	297	331	262	145	212	264	321	337	430	552	326	3,844
Madras	22	25	20	14	9	10	23	12	28	22	9	15	209
Assam	19	19	19	29	57	73	61	36	33	32	36	32	446
Burma	15	10	14	15	23	24	25	25	19	24	35	15	244
Andamans	70	52	98	149	152	188	223	152	105	120	109	79	1,497
PYREXIA OF UNCERTAIN ORIGIN.													
India	61	51	78	140	126	117	106	106	69	76	108	94	1,132
N.-W. F. P.	2	2	...	1	1	3	1	5	1	1	1	1	19
Punjab	4	12	2	5	24	24	15	14	3	4	26	10	143
U. P.	8	14	28	37	30	32	47	38	29	15	5	14	297
B. & O.	...	1	1	...	1	...	...	1	2	1	...	...	7
Bengal	28	15	28	68	40	39	23	29	24	43	48	32	417
C. P.	8	2	6	6	3	2	8	8	3	2	2	...	50
Bombay	...	...	2	...	1	...	1	1	...	...	...	...	5
Madras	...	1	...	2	1	2	...	...	1	...	1	1	9
Assam	...	...	1	...	4	1	...	...	...	...	...	...	6
Burma	11	4	9	21	21	13	8	10	6	10	23	36	172
Andamans	...	...	...	...	...	...	...	...	...	...	...	...	...
TUBERCULOSIS OF THE LUNGS.													
India	65	63	54	69	89	65	86	79	88	80	68	48	854
N.-W. F. P.	8	6	2	8	8	4	11	3	4	8	1	2	65
Punjab	8	5	6	16	11	9	15	23	20	24	13	15	165
U. P.	9	11	9	6	9	10	14	6	10	5	6	3	98
B. & O.	5	5	5	6	9	14	8	7	9	5	12	6	91
Bengal	14	7	9	9	13	9	7	9	14	8	10	5	114
C. P.	4	4	4	...	2	...	3	...	3	...	2	1	23
Bombay	2	1	2	5	3	2	4	4	3	4	5	3	38
Madras	4	4	4	3	4	5	7	6	5	5	4	8	59
Assam	3	4	3	1	5	3	1	4	3	3	3	...	33
Burma	6	15	7	12	22	8	13	13	13	14	6	2	131
Andamans	1	...	2	1	1	...	2	4	3	4	4	1	23

TABLE H.—ADMISSIONS BY MONTHS FROM CHOLERA, SMALLPOX, ENTERIC FEVER, MALARIA, PYREXIA OF UNCERTAIN ORIGIN, TUBERCULOSIS OF THE LUNGS, PNEUMONIA, DYSENTERY AND DIARRHŒA—*concld.*

	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.
PNEUMONIA.													
India	203	198	174	135	115	102	85	95	81	115	139	195	1,637
N.-W. F. P.	21	36	29	14	13	4	6	10	1	10	19	49	212
Punjab	51	32	25	19	13	6	8	9	12	11	19	50	255
U. P.	22	10	21	19	22	22	17	13	19	20	28	20	233
B. & O.	14	17	10	8	13	5	6	16	10	16	15	13	143
Bengal	25	24	18	29	19	17	13	12	10	14	21	19	221
C. P.	5	4	2	1	4	...	5	5	1	1	2	3	33
Bombay	27	38	25	19	8	15	10	6	8	10	16	21	203
Madras	5	3	5	3	3	1	2	2	4	5	2	2	37
Assam	1	8	7	8	3	10	4	6	7	10	4	5	73
Burma	23	19	25	11	14	17	11	14	7	10	9	7	167
Andamans	2	3	1	4	1	2	1	1	...	5	2	1	23
DYSENTERY.													
India	345	180	338	363	344	379	749	648	460	389	389	311	4,895
N.-W. F. P.	8	2	4	9	10	9	6	3	12	10	9	4	86
Punjab	43	12	46	68	50	45	46	80	98	79	49	17	633
U. P.	31	20	26	46	44	47	67	75	54	36	32	20	498
B. & O.	31	20	40	35	23	26	151	48	19	19	22	13	447
Bengal	91	51	103	89	93	97	180	152	87	81	123	126	1,273
C. P.	2	3	5	2	2	5	44	35	13	11	5	5	132
Bombay	60	19	34	39	22	32	120	120	55	39	40	45	625
Madras	30	21	23	26	39	26	57	39	29	38	60	34	422
Assam	16	16	47	32	39	45	30	44	43	45	24	14	395
Burma	14	3	1	9	12	28	29	24	20	20	14	19	193
Andamans	18	11	8	8	9	17	13	23	18	16	7	11	149
DIARRHŒA.													
India	141	148	282	237	269	260	456	344	230	175	166	158	2,866
N.-W. F. P.	3	1	6	2	1	3	...	3	6	2	5	3	35
Punjab	20	18	46	23	31	16	28	30	34	18	23	26	313
U. P.	17	39	63	41	46	32	96	44	26	33	20	18	475
B. & O.	5	8	16	12	15	12	44	36	13	10	7	9	187
Bengal	54	44	123	127	138	140	178	133	95	55	68	56	1,211
C. P.	1	1	7	4	5	6	33	10	6	4	1	1	7
Bombay	25	25	10	21	18	31	59	77	35	42	23	28	394
Madras	5	3	...	...	...	2	12	4	2	...	3	3	24
Assam	...	4	5	2	6	4	4	1	6	5	3	6	46
Burma	3	2	2	2	7	8	3	1	3	3	8	2	44
Andamans	7	1	3	3	2	5	4	1	2	1	1	2	32

Table I.—Details of Diseases.

	Admissions.	Deaths.
Jail population of India		**147,654**
Diseases caused by Infection or infestation.		
Blackwater fever	1	1
Chicken-pox	908	..
Cholera	35	7
Dengue	265	..
Dysentery	4,895	119
Enteric fevers	256	43
Enteritis infective (including food poisoning)	2	..
Erysipelas	60	6
Gangrene, acute infective	13	2
Hydrophobia (rabies)	1	1
Influenza	5,773	26
Jaundice spirochætal	29†	5†
Kala-azar	280	17
Leprosy	150	9
Malaria	23,119	91
Measles	74	..
Meningococcal infection (cerebro-spinal fever)	130	78
Mumps	1,751	1
Plague	2	2
Pyæmia	3	2
Pyrexia of uncertain origin	1,132	2
Rheumatic fever	464	3
Sandfly fever	406	1
Septicæmia	7	2
Smallpox	54	1
Tetanus	4	2
Tuberculosis pulmonary	854	320
Tuberculosis other cases	151	48
Venereal diseases—		
(*a*) Gonorrhœa	480	..
(*b*) Soft chancre	98	..
(*c*) Syphilis	701	7
(*d*) Other cases	1	..
Other diseases caused by infection	110	6
Diseases due to infestation by Metazoan Parasites.		
Ankylostomiasis	1,279	37
Ascariasis	41	..
Bilharziasis	5	..
Dracontiasis (Guinea-worm)	245	..
Intestinal tæniasis—		
(*a*) Tænia Solium	4	..
Other intestinal parasites	6	..
Scabies	697	..
Other diseases due to infestation	97	2

† Weil's disease.

TABLE I.—DETAILS OF DISEASES—*contd.*

	Admissions.	Deaths.
Diseases of the Nervous System.		
Cerebral hæmorrhage	1	1
Epilepsy	127	9
Meningitis	1	1
Neuralgia	172	1
Neuritis	58	1
Paralysis	30	1
Sciatica	39	..
Other diseases of the nervous system	176	17
Mental Diseases.		
Hysteria	1	..
Involution (Melancholia)	15	1
Mania	27	..
Neurasthenia	1	..
Schizophrenia (Dementia præcox)	13	..
Other mental diseases	17	2
Diseases of the Eye.		
Blepharitis	4	..
Conjunctivitis	745	..
,, granular (Trachoma)	46	..
Cataract	6	..
Glaucoma	11	..
Iritis	20	..
Keratitis	178	..
Other diseases of the eye	243	..
Diseases of the Ear.		
Inflammation of the external ear	89	1
Diseases of the middle ear	117	2
Diseases of the mastoid process	13	1
Other diseases of the ear	33	..
Diseases of the Nose.		
Diseases of the mucuous membrane	679	2
Other diseases of the nose	11	—
Diseases of the Circulatory System.		
Diseases of the valves	100	30
Disordered action of the heart	4	1
Diseases of blood vessels	4	2
Endocarditis	6	2
Myocarditis	45	13
Pericarditis	4	..
Other diseases of the circulatory system	71	32
Diseases of the Blood and blood forming organs.		
Anæmia primary Anæmia pernicious Anæmia secondary	500	43
Diseases of the spleen	61	1
Lymphadenitis	229	1
Lymphangitis	55	—
Other blood diseases	694	12

TABLE I.—DETAILS OF DISEASES—*contd.*

	Admissions.	Deaths.
Diseases of Glands of Internal Secretion.		
Goitre	1	..
Diseases of the Breast.		
Mastitis	4	..
Other diseases	1	..
Diseases of the Respiratory System.		
Asthma	786	30
Bronchitis	3,347	18
Empyema	5	4
Laryngitis	12	1
Pleurisy	197	8
Pneumonia :—		
(*a*) Lobar (*b*) Lobular (broncho-pneumonia)	1,637	398
Other diseases	143	10
Diseases of the Teeth and Gums.		
Caries of the enamel, dentine and cementum	39	..
Gingivitis	65	..
Pyorrhœa alveolaris	52	1
Other diseases	306	2
Diseases of the Digestive System.		
Appendicitis	77	1
Cholecystitis and cholangitis	14	
Colic	571	..
Colitis	3,817	19
Constipation	277	
Diarrhœa	2,866	25
Enteritis	172	21
Fistula in ano	26	..
Gastritis	95	2
Glossitis	2	..
Hæmorrhoids (piles)	597	3
Hepatitis acute	97	4
Hepatic abscess (tropical abscess)	25	2
Hepatitis chronic (cirrhosis)	55	5
Hernia	67	..
Indigestion	630	1
Intestinal obstruction	17	7
Jaundice	235	4
Pharyngitis	87	1
Peritonitis	18	9
Sprue	16	3
Stomatitis	140	..
Tonsillitis	119	..
Other diseases	651	31
Diseases due to Disorders of Nutrition or of Metabolism.		
Beri-beri	31	1
Diabetes mellitus	26	3
Gout	11	..
Inanition	8	1
Scurvy	13	..
Other diseases	20	..

TABLE I.—DETAILS OF DISEASES—*contd.*

	Admissions.	Deaths.
Diseases of the Male Organs of Generation.		
Balanitis	3	..
Epididymitis	3	..
Hydrocele of tunica vaginalis	110	..
Orchitis	246	1
Paraphimosis	8	..
Phimosis	35	..
Stricture of the urethra	13	..
Urethral fistula	7	1
Urethritis	23	..
Other diseases	188	4
Diseases of the Female Organs of Generation.		
Abortion	4	..
Affection connected with pregnancy and Parturition and consequent on parturition.	3	..
Displacements and distortions of the uterus	3	..
Dysmenorrhœa	1	..
Endometritis	1	..
Menorrhægia	2	..
Other diseases peculiar to women	56	2
Diseases of Bones, Joints, Muscles, Fasciae and Bursae.		
Arthritis	56	..
Diseases of the spine	8	..
Myalgia	295	..
Osteo-myelitis	9	..
Periostitis	22	..
Synovitis	210	..
Other diseases	238	1
Diseases of the Areolar Tissue.		
Boil	898	..
Carbuncle	41	1
Cellulitis	904	9
Cellulitis suppurative (abscess)	2,755	1
Other diseases	70	1
Diseases of the Skin.		
Dermatitis	25	..
Eczema	416	..
Herpes zoster	23	..
Impetigo	9	..
Onychia	1	..
Prickly heat	5	..
Psoriasis	7	..
Urticaria	27	..
Whitlow	211	..
Other diseases	1,792	4

TABLE I.—DETAILS OF DISEASES—*concld.*

	Admissions.	Deaths.
Diseases of the Urinary organs.		
Calculus, kidney	6	1
Cystitis	35	3
Hæmaturia	9	..
Nephritis acute	106	22
,, chronic	99	23
Other diseases	170	11
General Injuries.		
Burns and scalds	93	3
Heat exhaustion	6	..
Heat stroke	204	14
Sun stroke	57	7
Other injuries	105	9
Local Injuries.		
Abrasions	165	..
Burns and scalds	134	1
Concussions	3	1
Contusions	418	2
Dislocations and displacements	36	..
Fractures	254	8
Sprains and strains	150	..
Wounds, gun-shot	25	1
,, others	1,764	4
Injuries self-inflicted	1	1
Other injuries	432	12
Tumours and Cysts.		
Carcinoma	20	8
Cysts	65	2
Sarcoma	13	2
New growths, malignant (other cases)	18	4
,, ,, non-malignant.	6	1
Malformations	5	..
Poisons.		
Opium	2	1
Venom of insecta	2	..
,, Ophidia (snake bite)	11	..
Other poisons	14	1
No appreciable diseases	21	..
All other causes	294	4
Total	80,075	1,808

GIPD—88 DGIMS—20-11-36—820.

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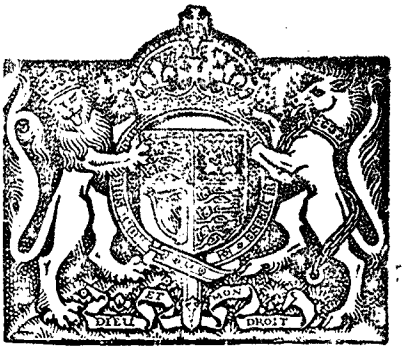

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ABBREVIATIONS.

A.	Admissions.
Av. C. S.	Average constantly sick.
B. O. Rs.	British Other Ranks.
C. M. %	Case mortality per cent.
D.	Deaths.
I. O. Rs.	Indian Other Ranks.
N. C. Os.	Non-Commissioned Officers.
P.	Primary.
P. A.	Per annum.
P. M.	Per mille.
P. U. O.	Pyrexia of uncertain origin.
R.	Revaccinations.
U. K.	United Kingdom.
V. D.	Venereal diseases.
V. D. H.	Valvular diseases of the heart.

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SECTION I.

ON THE HEALTH OF THE BRITISH ARMY IN INDIA.

(From the Director of Medical Services in India.)

1. General health statistics of the British Army in India during the year 1934 are given in the table below :—

TABLE 1.

1934.	Average strength.	Admissions.		Deaths.		Invalids sent home.		Invalids discharged in India.		Invalids finally discharged in U. K.		Average constantly sick.	
		No.	Ratio per 1,000.	No.	Ratio per 1,000.	No.	Ratio per 1,000.	No.	Ratio per 1,000.	No.	Ratio per 1,000.	No.	Ratio per 1,000.
Officers . .	2,344	1,006	429·2	16	6·83	37	15·78	..	..	..	..	34·05	14·53
B. O. Rs.' .	54,429	31,246	574·1	121	2·22	511	9·39	..	..	..	..	1,411·13	25·93
I. O. Rs.' Wives.	4,480	1,396	311·6	10	2·23	56	12·50	..	..	..	..	47·23	10·54
B. O. Rs.' Wives' parturition.	..	848	..	..	..	..	..	..	..	..	..	33·22	..
B. O. Rs.' Children.	6,932	2,076	299·6	82	11·83	16	2·31	..	..	..	..	64·95	9·37
Others . .	..	2,350	..	29	..	50	..	..	..	..	..	67·17	..

The ratios per 1,000 for admissions, deaths and invalids, amongst officers and other ranks for the quinquennial periods 1910-14, 1920-24, 1925-29 and 1930-34 with that for 1930, 1931, 1932, 1933 and 1934 are given separately for purposes of comparison in the following table :—

TABLE 2.

Periods.	Ratio per 1,000.					
	Admissions.		Deaths.		Invalids.	
	Officers.	Other Ranks.	Officers.	Other Ranks.	Officers.	Other Ranks.
1910—14 . .	567·5	567·2	5·14	4·36	16·30	7·03
1920—24 . .	676·7	791·9	6·71	5·24	20·99	18·91
1925—29 . .	589·9	619·4	5·25	2·90	17·44	13·50
1930—34 . .	428·6	604·7	6·69	2·64	20·09	8·88
1930 . . .	392·3	611·3	5·95	2·78	21·69	8·70
1931 . . .	420·4	647·0	7·76	2·78	17·68	9·76
1932 . . .	463·2	581·5	6·54	2·96	27·45	7·39
1933 . . .	43[illegible]·8	60[illegible]·6	6·37	2·44	17·83	9·15
1934 . . .	**429·2**	**574·1**	**6·83**	**2·22**	**15·78**	**9·39**

B. O. Rs.—British Other Ranks.

Officers.

2. 429·2 per 1,000 of strength were admitted to hospital during the year, compared with 437·8 in 1933.

The principal causes of sickness were :—

Cellulitis	82	Appendicitis	27
Dysentery	79	Contusion	21
Malaria	77	Concussions	17
Sandfly fever	57	Gastritis	16
Influenza	56	Sprain and strain	15
Tonsillitis	52	Boils	14
Jaundice	43	Pharyngitis	14
Diarrhœa	42	Bronchitis	13
Fractures	33	Synovitis	11

There were 16 deaths giving a ratio of 6·83 per 1,000 compared with 18 and 6·37 per 1,000 in 1933.

The causes of death were G. S. Wound 5 cases, diseases of the digestive system 3 cases, injuries 2 cases, typhoid fever 2 cases, diseases of the circulatory system 2 cases, infraction of the lung and acute anterior poliomyelitis each one case.

The average constantly sick in hospital was 34·05 or 14·50 per 1,000 of strength as compared with 33·91 or 14·40 in the previous year.

1,354 or 577·6 per 1,000 of the strength were treated as out-patients.

Soldiers.

3. 31,246 or 574·1 per 1,000 of the strength were admitted to hospital, compared with 609·6 in 1933 and 580·5 in 1913.

The principal causes of admission to hospital showing the increase or decrease compared with the previous year were :—

	1934.	Increase or decrease.		1934.	Increase or decrease.
Malaria	3,676	—2,005	Bronchitis	775	+ 31
Cellulitis	2,335	— 143	Fractures	658	— 36
Sandfly fever	1,973	— 279	Synovitis	528	+ 38
Tonsillitis	1,696	— 81	Appendicitis	475	+ 86
Dysentery	1,389	+ 20	Boils	452	+ 49
Gonorrhœa	1,370	+ 94	Pharyngitis	441	+ 64
Sprain	998	— 11	Jaundice	397	+ 5
Influenza	897	— 247	Impetigo contagiosa	370	+ 18
Contusion	826	+ 116	Wounds	363	+ 21
Diarrhœa	811	— 31	Dengue	360	—284

There were 2,282 fewer admissions in 1934 than in the previous year. The biggest drop (2,005) occurred in the malaria admissions, but dengue, sandfly fever and influenza also show substantial decreases.

There were 121 deaths or 2·22 per 1,000 of the strength compared with 134 or 2·44 per 1,000 in 1933. This is the lowest death ratio ever recorded amongst British Troops in India.

The most important causes of mortality were :—

Local injuries	27
General injuries	17
Pneumonia	11
Enteric group of fevers	7

511 or 9·39 per 1,000 of the strength were sent home as invalids, compared with 503 or 9·15 per 1,000 in 1933.

The principal causes of invaliding to the United Kingdom were :—

	1934.	Increase or Decrease.		1934.	Increase or Decrease.
Pulmonary tuberculosis	51	+ 3	Diseases of urinary system	16	+ 4
Mental diseases, other than schizophrenia and neurasthenia.	39	— 2	Otitis media	14	—10
			Valvular diseases of the heart	13	— 3
Epilepsy	26	—14			
Diseases of joints	24	— 7	Diseases of bronchi and bronchioles	13	..
Deformities of limbs	24	+ 4	Tachycardia	12	+ 5
Fractures	20	— 1			
Schizophrenia	20	— 3	Tuberculosis, other than pulmonary	10	— 2
Injuries, other than fractures	17	— 2	Neurasthenia	8	— 6

The average number constantly sick in hospital was 1,411·13 or 25·93 per 1,000 of the strength, compared with 1,476·69 or 26·85 per 1,000 in 1933.

The diseases chiefly responsible were :—

Gonorrhœa	167·31	Sprain and strain	32·14
Malaria	120·26	Bronchitis	28·24
Cellulitis	81·04	Contusions	24·58
Dysentery	65·43	Soft chancre	23·63
Fractures	47·50	Jaundice	23·20
Tonsillitis	41·81	Syphilis	21·96
Sandfly fever	38·93	Influenza	21·20
Appendicitis	33·52	Synovitis	20·78

89,689 men, or 1,647·8 per 1,000 of the strength were treated as out-patients, with an average daily number under treatment of 1,266·52 or 23·27 per 1,000.

The combined ratio constantly sick in hospital and under treatment as out-patients was 49·19 per 1,000 of the strength, compared with 49·71 in 1933.

The actual loss to the Army in India in working days was 514,916 due to sick in hospital and 462,280 due to sick in barracks, making a total of 977,196 days compared with 997,819 in 1933.

The admission and death ratios per 1,000 of the strength for all causes and certain important diseases for stations with a strength of 1,000 and upwards compared with all India, are shown in the following table :—

TABLE 3.

Table showing admission and death ratios per 1,000 of the strength for all causes and certain important diseases for stations with a strength of 1,000 and upwards compared with all-India.

		Stations with total admsision ratios higher than all-India.						
		Peshawar.	Nowshera.	Quetta.	Jhansi.	Sialkot.	Lahore.	All-India.
Strength.		1,434	1,897	2,491	1,147	1,279	1,068	54,429
All Causes.	A.	951·9	729·0	685·3	661·3	600·5	590·8	574·1
	D.	6·97	1·58	1·20	2·62	2·35	4·68	2·22
	Av. c. s.	42·26	28·32	28·13	27·38	24·45	31·54	25·93
Malaria	A.	192·5	77·5	171·8	55·8	79·7	43·1	67·5
	D.	...	...	...	...	...	...	0·04
Sandfly fever	A.	289·4	150·2	...	40·1	63·3	41·2	36·2
	D.	...	...	...	...	...	...	...
Enteric group of fevers	A.	4·9	1·1	2·0	7·0	...	0·9	1·7
	D.	1·39	...	...	0·87	...	...	0·13
Dysentery	A.	46·7	20·0	63·0	45·3	27·4	8·4	25·5
	D.	...	...	...	...	...	...	...
Diarrhœa	A.	15·3	26·4	7·2	27·9	16·4	14·0	14·9
	D.	...	...	...	...	...	...	...
Influenza	A.	8·4	23·7	52·2	35·7	...	12·2	16·5
	D.	...	...	...	...	...	...	...
Pneumonia (Lobar and Lobula)	A.	2·8	4·2	2·8	7·0	13·3	7·5	3·9
	D.	...	...	...	...	...	0·94	0·20
Venereal diseases.	A.	27·2	25·8	23·3	27·9	29·7	43·1	...
	D.	...	...	...	...	...	...	34·1
Minor septic diseases	A.	58·6	51·1	53·2	83·7	53·2	56·2	...
	D.	...	...	...	...	...	...	57·9
Local injuries	A.	83·0	72·7	51·4	61·9	73·5	75·8	0·04
	D.	2·79	0·53	0·40	...	...	...	62·3
Heat-stroke	A.	...	1·3	...	1·7	...	0·9	0·48
	D.	...	0·56	...	...	...	0·94	0·2
Heat exhaustion.	A.	3·5	1·6	...	4·4	...	0·9	0·19
	D.	1·39	..	...	0·87	...	..	1·4
								0·07

A.—Admissions.
D.—Deaths
Av. C. S.—Average constantly sick.

TABLE 3—*contd.*

Table showing Admission and Death Ratios per 1,000 of the strength for all Causes and certain important diseases for stations with a strength of 1,000 and upwards compared with All-India.

Strength.		Stations with total admission ratios lower than all—India.												
		Mhow.	Secunderabad.	Jubbulpore.	Rawalpindi.	Karachi.	Calcutta.	Bangalore.	Ranikhet.	Meerut.	Poona.	Razmak.	Lucknow.	All-India.
		1,530	2,742	1,389	2,429	1,141	1,022	1,319	1,071	1,925	2,416	1,063	2,340	54,429
All Causes	A.	570·6	554·3	549·3	539·3	496·9	481·4	465·5	465·0	464·9	457·8	456·3	435·9	574·1
	D.	2·61	3·28	4·32	...	0·88	3·91	1·52	1·87	3·12	2·48	2·82	2·56	2·22
	Av. c. s.	23·57	28·37	25·90	26·74	31·89	25·03	27·87	31·58	28·15	32·08	16·56	17·89	25·93
Malaria	A.	101·3	16·8	74·9	51·5	77·1	23·5	3·0	16·8	29·6	55·5	97·8	19·7	67·5
	D.	0·65	...	...	...	...	...	...	...	0·52	...	...	...	0·04
Sandfly fever	A.	2·6	13·1	2·2	46·9	26·3	...	...	...	4·7	0·8	...	52·1	36·2
	D.	...	...	...	...	...	...	...	...	...	...	...	...	...
Enteric group of fevers.	A.	...	1·5	0·7	1·2	1·8	3·9	...	1·9	0·5	0·4	...	0·4	1·7
	D.	...	0·36	...	...	...	...	...	...	...	...	...	...	0·13
Dysentery	A.	26·1	50·3	41·8	22·6	23·7	31·3	25·8	23·3	30·1	28·6	12·2	15·0	25·5
	D.	...	...	...	...	...	...	...	...	...	...	...	...	...
Diarrhœa.	A.	30·1	25·5	9·4	9·5	8·5	9·8	3·8	14·9	8·8	7·0	11·3	14·1	14·9
	D.	...	...	...	...	...	...	...	...	...	...	...	...	...
Influenza	A.	58·2	14·2	5·8	23·1	...	47·9	4·5	1·9	...	14·1	6·6	8·5	16·5
	D.	...	...	...	...	...	...	...	...	...	...	...	...	...
Pneumonia (lobar and lobular).	A.	4·6	2·9	1·4	5·4	1·8	5·9	0·8	...	4·7	2·1	9·4	2·6	3·9
	D.	1·31	...	...	...	...	...	...	...	...	...	1·88	0·43	0·20
Venereal diseases.	A.	18·3	22·6	23·8	17·7	20·2	36·2	52·3	17·7	30·6	20·7	3·8	45·7	34·1
	D.	...	...	...	...	...	...	...	...	...	...	...	...	...
Minor septic diseases	A.	35·3	55·1	62·6	67·1	42·9	25·4	81·1	36·4	35·8	36·8	54·6	42·3	57·9
	D.	...	...	...	...	...	...	...	...	0·52	...	...	...	0·04
Local injuries	A.	50·3	57·3	67·7	58·0	57·8	18·6	55·3	66·3	69·1	52·2	39·5	42·7	62·3
	D.	...	1·09	...	...	0·88	1·96	0·76	...	0·52	0·41	...	0·43	0·48
Heat-stroke	A.	...	...	...	...	0·9	1·9	...	...	...	...	...	...	0·2
	D.	...	...	...	...	...	0·98	...	...	...	...	...	...	0·10
Heat exhaustion.	A	0·4	1·4	...	...	...	...	...	...	...	...	...	0·9	1·4
	D.	...	...	...	...	...	...	...	...	...	...	...	...	0·07

A.—Admissions.
D.—Deaths.
Av. C. S.—Average constantly sick.

Women and Children (B. O. R.'s).

4. 1,396 women or 311·6 per 1,000 of the strength were admitted to hospital, compared with 1,368 or 313·2 per 1,000 in 1933.

The principal causes of admission to hospital were :—

Malaria	112	Appendicitis	47
Abortion	100	Diarrhœa	43
Dysentery	61	No appreciable disease	36
Tonsillitis	55	Constipation	31
Bronchitis	48	Cellulitis	29

In addition, 848 women were admitted to hospital for parturition.

3,092 or 690·2 per 1,000 of the strength were treated as out-patients.

2,077 children or 299·6 per 1,000 of the strength were admitted to hospital compared with 1887 or 281·9 in 1933.

The principal causes of admission to hospital were :—

Tonsillitis (including inflammation and hypertrophy)	259		
Bronchitis	184	Cellulitis	63
Dysentery	160	Measles	60
Diarrhœa	145	Pneumonia	62
Malaria	140	Enteritis	50
Constipation	70	Inanition	35

There were 82 deaths giving a ratio of 11·83 per 1,000.

The chief causes were :—

Pneumonia	12	Dysentery	9
Enteritis	11	Meningitis	3
Inanition	10	Atelectasis	3
Premature birth	9		

5,112 or 737·4 per 1,000 of the strength were treated as out-patients.

TABLE No. 4.

	Number of admissions to hospital.	Deaths.	Invalids sent home.	Average constantly sick.
Royal Navy	59	..	..	4·71
Royal Air Force (Wives and Children)	67	1	..	1 80
Royal Air Force	1,052	1	14	20·51
Parturition (wives) Royal Air Force	4	..	..	0·16
Q. A. I. M. N. S.	92	..	13	4 63
Wives of officers (British and Indian Service)	346	4	17	10·51
Wives of officers (British and Indian Service) Parturition	105	..	..	4·23
Children of officers (British and Indian Service)	222	7	6	5 63
Royal Indian Marine	24	..	..	0·86
Patients not belonging to His Majesty's Regular Troops	361	16	..	13·48
Parturition cases of wives of personnel not belonging to His Majesty's Regular Troops	18	..	..	0·65

PRINCIPAL DISEASES AFFECTING THE BRITISH ARMY.

Cerebro-spinal meningitis.

5. Cerebro-spinal meningitis has in recent years been increasing to a marked extent among the civilian population of India. This increase is reflected in the incidence among Indian troops, but it is gratifying to observe that among British troops only 2 cases (one fatal) have occurred.

The incidence falls largely on recruits, 18 of the 38 Indian cases falling into this category.

Table No. 5 shows admissions, deaths and mortality rate of all cases coming under military treatment. The mortality rate of 1934 is considerably lower than in previous years. While, no doubt, there are many factors involved in this result, it is not without interest that it coincides with the adoption of a three-times concentrated therapeutic serum (this being now the only type used), and with the spread of the policy of administering this serum intrathecally in daily doses from the earliest possible moment until the issue of the case is beyond doubt. In those cases which recovered (excluding one case—a boy—where treatment was refused by the parents) the average quantity of serum given per case was 119 c. cs. intrathecally and 86 c. cs. by other routes.

In one hospital this routine treatment was carried out, and in addition iodine was administered intravenously. Of 8 cases so treated only 2 died, 3 of these 8 cases were classed as very severe, 3 as severe, and two as moderately severe, so that the results may be regarded as good. This treatment merits, and is receiving, further investigation.

Table No. 5.

Incidence, Deaths, and case mortality in Cerebro-spinal meningitis.

	1930.			1931.			1932.			1933.			1934.		
	A.	D.	C. M. %	A.	D.	C. M. %	A.	D.	C. M. %	A.	D.	C. M. %	A.	D.	C. M. %
B. O. Rs. . .	1	..	..	2	2	100	8	6	75	3	2	66·6	2	1	50
I. O. Rs. . .	15	12	80	15	9	60	9	9	100	24	16	66·6	38	15	39·5
Officers, Women and Children.	..	..	..	..	..	..	..	..	..	1	1	100	..	..	..
Others . .	..	..	..	..	..	..	..	..	..	1	1	100	12	4	33
Total .	16	12	75	17	11	64·7	17	15	88·2	29	20	69·0	52	20	38·5

C. M. %=Case mortality per cent.

Cysticercosis.

6. Two cases of this disease occurred, one of which was rapidly fatal. Much attention has been directed to the hygienic control of piggeries and to the examination of pork, in the hope that a decrease in infestation with *T. solium* (40 cases of which occurred among British troops) may lead to a corresponding decrease in cysticercosis. All officers are alive to the importance of this subject, and all known steps for the prevention of the disease are being taken.

26 cases of the various types of epilepsy were invalided during the year.

Dengue, Sandfly fever, Fevers of the Typhus Group, and P. U. O.

7. Table No. 6 shows the incidence of these diseases for the last three years.

TABLE No. 6.

	1932.		1933.		1934.	
	Admns.	Ratio per 1,000.	Admns.	Ratio per 1,000.	Admns.	Ratio per 1,000.
Dengue . .	432	7·8	644	11 7	360	6·6
Sandfly fever .	2,262	40·9	2,252	40·9	1,973	36·2
Fevers of the Typhus Group. . .	11	0·2	23	0·4	52	1·0
P. U. O. . .	106	1·9	61	1·1	46	0·8

Dengue.

The incidence is the lowest that has been recorded in the last 10 years.

As in previous years, the disease is confined mainly to the garrisons of ports.

The incidence of dengue bears a close relationship to that of malaria, as can be seen in Table No. 7 which shows the ratio per 1,000 for the last 10 years. In most years the incidence of malaria is approximately 10 to 12 times that of dengue.

TABLE No. 7.

	1925	1926	1927	1928	1929	1930	1931	1932	1933	1934
Dengue .	14·3	26·6	14·1	17·5	6·8	9·4	11·8	7·8	11·7	6·6
Malaria .	159·0	165·3	138·8	91·3	116·0	118·4	112·5	84·1	103·3	67·5

Sandfly fever.

Research on this subject has suffered an unfortunate check through inability to maintain lack of continuity in the appointment of officers specially selected for investigation of this disease.

Under the present conditions, in the localities in which this fever is of importance, it is not practicable to prevent sandflies from breeding. Neither are the climatic conditions such that the use of small mesh nets can be advocated. As funds permit, old and unsuitable barracks in certain of these stations are being replaced by barracks of improved construction and design, from which it will be much easier to eliminate sandflies. It is hoped that this measure will give rise to some improvement.

Fevers of the Typhus Group.

The increased number of cases of fever of the typhus group which have been reported this year does not necessarily indicate an increase in the incidence of the disease. It is more probably a sign of the greater interest which is being taken in this condition and of the improved methods of diagnosis which are available.

Special case sheets have been maintained for all these cases and an examination of the results of 110 cases (all ranks British and Indian and their families) reported on these forms reveals various points of interest and importance which have not previously been fully realised.

The Indian form of this disease is commonly known as Indian Tick Typhus—although this actual name has not been used in Army nomenclature since 1932—and the generally accepted idea is that only one type of the disease exists in the country.

As the result of testing the serum of all cases against standardised suspensions of the " O " antigen of *B. proteus* X2, XK, and X19 it has been definitely shown that a type of typhus, closely related in its clinical and serological characters to " Scrub Typhus " of Malaya, is to be found scattered throughout India. In the period under review this had a very definite seasonal incidence, the vast majority of cases occurring between the middle of August and the beginning of October—*i.e.*, during the latter portion of the monsoon. The rash in these cases was relatively inconspicuous and disappeared completely in about 7 days. There was a well marked rise in agglutinins of the XK type, accompanied by practically no co-agglutinins for X2 and X19. No evidence was forthcoming as to the vector. None of the cases gave any history of tick-bite. By analogy, it seems possible that a mite may be responsible.

Another type of the disease first appearing in July and rising to a maximum in December occurred chiefly in certain districts in Southern Command. This is undoubtedly the form which has been described as " Indian Tick Typhus ". The rash in this type of the disease differs in certain important particulars from that which occurs in the XK type. It is much more conspicuous, is generalised in distribution—being present on the palms and soles—and is of prolonged duration persisting in certain cases for a month or more, the average being from two and three weeks. On the whole the symptoms are more severe in this than in the XK type of case. The serological results in these cases are variables in some, agglutinins for X2 predominate ; in others, the balance is in favour of X19. It would appear that this is probably a group response, and that the strain of *B. proteus* which embodies the main antigen of this virus has yet to be discovered. In the 1934 series of cases there is no evidence that the patients were bitten by ticks, and the question of the vector must remain an open one, although there are undoubtedly grounds for suspecting the tick. This matter is being investigated. These cases bear a very close resemblance to the Rocky Mountain Fever, Fievre Boutonnense, African Tick-bite fever group, differing from the two latter in not showing a primary lesion.

A third type of the disease is found chiefly in the South of India, the majority of cases having occurred this year in Bangalore. Most of the patients were Indians and showed no rash. A transient rash of varied type and distribution appeared in 5 of the 6 British cases. This type had no definite seasonal incidence, but was absent during the hot weather months. The serum in most of the cases agglutinated X19 to a high titre. It is of course possible that this type may be merely a varient of the second type, but on the whole there is

good reason to regard it as a separate entity, possibly a member of the Endemic Typhus (flea-borne) sub-group. There is no evidence of either tick or louse transmission. Experiments with rats and rat fleas have up to date been negative.

Certain cases have occurred which, in the absence of further information, cannot at present be placed in any of these three groups.

Three cases had a fatal termination. It is considered that all of these belonged to the second group.

An interesting point common to cases of all types, and one which explains why the correct diagnosis has been overlooked in the past, is that many of them show a well marked rise in agglutinins for one or other of the enteric group organisms. Blood cultures have of course been carried out and have given negative results in this respect.

It is proposed to make use of absorption tests to throw further light on the exact nature of these agglutinin reactions against both proteus and enteric strains.

A few cases have developed a positive Wassermann reaction which has gradually subsided to negative during convalescence.

These fevers have been almost entirely confined to males. In the series of 110 cases, one, which occurred in a girl aged 10, is the only deviation from the rule.

Pyrexia of Uncertain Origin.

The number of cases classified under this diagnosis continues to decrease.

Diphtheria.

8. Sporadic cases continue to occur, and the figures have remained at a very constant level. There have been no outbreaks of epidemic nature among British troops.

Enteric Fevers.

9. The incidence of enteric fevers among British and Indian troops during the years 1932, 1933 and 1934 is shown in Table No. 8.

TABLE No. 8.

British.

	1932.				1933.				1934.			
	Actuals.		Ratio per 1,000.		Actuals.		Ratio per 1,000.		Actuals.		Ratio per 1,000.	
	A.	D.	A.	D.	A.	D.	A.	D	A.	D.	A.	D
Typhoid	64	12	1·2	0·22	56	11	1·0	0·20	27	5	0·5	0·09
Para. A	22	...	0·4	...	14	...	0·3	...	8	...	0·1	...
Para. B	2	..	0·04	...	1	...	0·02	...	...	...	...	...
Para. C	...	...	...	...	...	...	...	...	1	...	0·02	...
Enteric group	100	3	1·8	0·05	102	3	1·9	0·05	55	2	1·01	0·04
Total	188	15	3·4	0·27	173	14	3·1	0·25	91	7	1·7	0·13

Indian.

	1932.				1933.				1934.			
	Actuals.		Ratio per 1,000.		Actuals.		Ratio per 1,000.		Actuals.		Ratio per 1,000.	
	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.
Typhoid	97	9	0·8	0·07	81	15	0·7	0·13	78	11	0·66	0·09
Para. A	45	1	0·4	0·01	38	1	0·3	0·01	45	...	0·38	...
Para. B	8	...	0·1	...	2	...	0·02	...	4	...	0.03	...
Para. C	1	...	0·01	...	3	...	0·03	...	2	...	0·02	...
Enteric group.	105	7	0·9	0·06	120	7	1·0	0·06	93	4	0·8	0·03
Total	256	17	2·1	0·14	244	23	2·1	0·20	222	15	1·9	0·13

The incidence among British troops has decreased almost by half, reaching a lower level than has ever previously been touched. Among Indian troops the decrease which has been in progress in recent years has been maintained, but this is in no way proportionate to the very marked drop which has occurred among British troops. Deaths have been halved among British troops, and decreased from 23 to 15 among Indian troops.

There have been no epidemic outbreaks among the troops, the majority of cases having been sporadic in nature. Occasional groups of two or three cases have occurred denoting a common but transient source of origin. In the examinations of menials which were carried out during the year (10,572 men being examined with a total of 35,895 tests), 7 carriers (6 of *Bact. typhosum*, and 1 of *Bact. paratyphosum* A) were discovered. The absence of outbreaks bears witness to the fact that the system which is in vogue is producing the desired result.

As a contrast, it may be mentioned that in one area a number of cases occurred in families which had moved to the hills and were staying in hotels and clubs. No carrier was discovered, but the distribution of the cases left no doubt that that one or more carriers were responsible.

There is nothing new to report from the point of view of diagnosis or treatment. Faith in the value of the agglutination test as a method of diagnosis is being further undermined by results which have been obtained in repeated routine tests in cases which prove to belong to the typhus group.

It is perhaps worthy of mention that in cases of typhoid fever proved by the recovery of the organisms, agglutination against a " TO " suspension was negative in over 80 per cent. the dates of the last tests performed in each case ranging between the 5th and the 41st days. In the 20 per cent. of cases in which agglutination occurred at a titre of from 1/125 to 1/250, this was found by the 9th day at latest. These results go to confirm the previously expressed opinion that, while positive results from the test may be of significance, negative results, which are most numerous, cannot be regarded as of any diagnostic value.

The inoculation state is shown in Table No. 9. It must be explained that the strengths shown in this and the following table are the average of the two half-yearly returns rendered on this subject. They are therefore only approximate, and do not correspond with the correct total strengths shown elsewhere.

TABLE NO. 9.

British Other Ranks.

Group.	Strength.	Actuals.		Ratio per 1,000.		Case mortality per cent.
		Cases.	Deaths.	Cases.	Deaths.	
Protected .	54,229	84	6	1·5	0·11	7·14
Unprotected .	773	7	1	9·1	1·29	14·29

The inoculation state of officers, other ranks, and to a lesser extent women is satisfactory. That of children is poor.

Table No. 10 gives the actual incidence of cases among these different classes, showing the types of fever and the distribution between protected and unprotected.

TABLE No. 10.

		Average strength.	Admissions.					Total.
			Typhoid.	Para. A.	Para. B.	Para. C.	Enteric group.	
British Officers (British and Indian Service).	Protected	4,165	3	...	...	...	1	8
	Unprotected	327	1	1	...	...	2	
B. O. Rs.	Protected	54,228	26	8	...	1	49	91
	Unprotected	773	1	...	...	...	6	
Women	Protected	5,816	3	...	...	...	...	7
	Unprotected	468	3	...	...	...	1	
Children	Protected	6,553	2	...	...	1	...	28
	Unprotected	1,797	22	...	1	...	2	

The distribution of the diagnosis " enteric group " merits attention. Its incidence is double that of typhoid fever in B. O. Rs., is slightly less than typhoid fever in officers (the figures are too small to be significant), and is markedly less in women, and especially in children. The explanation of this is very difficult to see, as the B. O. R. is much more assiduously tested by blood culture than the other classes. There is a rough correspondence by inverse ratio to the state of protection by prophylactic inoculation, but it is not considered that this is related : for where typhoid fever occurs in the form of an outbreak among B. O. Rs. there is little difficulty in getting 100 per cent. positive cultures irrespective of the inoculation state.

Although not properly falling into this section, the incidence of typhoid fever among children affords some very instructive comparisons. The admission rate per 1,000 is 2·69, while that for British officers is 0·94, for British other ranks 0·5, and for women 0·99.

22 of the 24 children who contracted typhoid fever had not been inoculated. Table No. 11 shows the age distribution.

TABLE No. 11.

Under 1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	Over 10
..	4	4	3	3	3	2	2	0	1	2*

One case in a child aged 14 months was complicated by bronchitis and proved fatal.

Of the remaining 23 cases, 10 were reported as severe, 1 as moderate, and 12 as mild.

This rather disturbing number of cases is an indication both of the value of prophylactic inoculation and of the necessity for reconsidering the regulations regarding the minimum age at which inoculation should be carried out.

* Inoculated.

Dysentery, Diarrhœa, Colitis and Amoebic Hepatitis.

10. The incidence for the last three years is shown in Table No. 12.

TABLE No. 12.

	Dysentery.		Diarrhœa.		Colitis.		Total.		Amœbic Hepatitis and Liver abscess.	
	Actuals.	Ratio per 1,000.	Actuals.	Ratio per 1,000.	Actuals.	Ratio per 1,000.	Actuals.	Ratio per 1,000.	Actuals.	Ratio per 1,000.
1932. .	1,385	25·0	732	13·2	31	0·6	2,148	38·8	69	1·2
1933. . .	1,369	24·9	842	15·3	53	1·0	2,264	41·2	36	0·7
1934. . .	1,389	25·5	811	14·9	42	0·8	2,242	41·2	52	0·96

The admission ratio is the same as that for 1933. The average constantly sick ratio, the average sick time in days, and the average number of days lost per 1,000 per annum all show slight decreases indicating that the type of case was less severe than in the previous year. 10 men were invalided (5 amœbic dysentery, 5 bacillary dysentery) as opposed to 8 in 1933, but there were no deaths (1 in 1933).

The position is disappointing. In practically every other disease except dysentery, the general improvement in the hygienic environment of the soldier had led to a decrease in incidence. In dysentery the general trend is in upward direction inspite of all the measures which have been taken to control it. The wide spread distribution of the disease in the civil population and the primitive system of disposal of excreta which exists in most stations, combined with the presence of flies, create a problem which has so far defied solution.

The proportions of the different types of dysentery remain very constant (see Table No. 13).

TABLE No. 13.

	Actuals.	Ratio per 1,000.	
Protozoal (E. hist.)	163	11·74	
Bacillary dysentery (Bacteriologically proved)	513	36·93	64·5
Bacillary exudate (No dysentery bacillary isolated)	383	27·57	
Clinical	330	25·76	

The general lines of treatment remain the same, and are on the whole satisfactory. The great majority of cases were of a mild nature.

The incidence of dysentery in Quetta remained at a high level during the first 8 months of 1934. Thereafter the figures are below those of 1933, and it seems possible that the outbreak is abating. Subsequent figures support the view.

The scheme of classification of dysentery bacilli which was introduced three years ago continues to give satisfactory results, and it is possible to recognise immediately all but a small proportion of the dysentery bacilli which are isolated.

Table No. 14 is an analysis of organisms isolated in the last five years from all specimens submitted to laboratories.

TABLE No. 14.

Year.	Non-mannite fermenting.			Mannite fermenting.					
	Shiga.	Schmitz.	Total.	Andrews' Types.	Sonne.	New Types.	Unclassified.	Total.	Percentage unclassified.
1930 . .	330	97	427	1,077	67	..	360	1,504	23·9
1931 . .	340	79	419	1,138	69	..	331	1,538	21·5
1932 . .	384	126	510	1,007	108	126	152	1,393	10·9
1933 . .	253	80	333	960	198	315	91	1,564	5·8
1934 . .	**191**	**95**	**286**	**921**	**202**	**313**	**27**	**1,463**	**1·8**

Investigations of the mannite fermenting organisms which are still unclassified continue. One other type which was identified during the original investigation, but which was at that time very rare, has since been found to occur not uncommonly in other parts of India. Its antibody has therefore been included in one of the diagnostic polyvalent sera which are issued.

Accumulating evidence, which it is hoped to publish in the near future seems to confirm that all these new types are actual causes of dysentery.

Certain rare non-mannite fermenting organisms allied to *B. dysenteriae* shiga and *B. dysenteriae* schmitz are being investigated in the District Laboratory, Quetta.

Tropical abscess of the liver and hepatitis.

There were 69 admissions under the above heading, of which 52 were considered to be amœbic in origin. The actual number of cases was 48, as two cases relapsed once, and one twice.

Only four cases developed to the stage of abscess formation, and it is interesting to note that these were all "old soldiers", *i.e.*, one Assistant Surgeon, one Regimental Quartermaster Serjeant and two serjeants. Two of these four cases were fatal. The majority of the remaining cases were early and trivial, and symptoms quickly subsided when emetine was administered.

Malaria.

TABLE No. 15.

11. *Malaria—Ratio per 1,000—British Troops.*

Commands.	Total.	
	1933	1934
Northern	159·8	**75·8**
Eastern	62·6	**48·1**
Southern	60·6	**55·3**
Western	204·0	**163·4**
Burma District	39·8	**54·9**
All-India	103·3	**67·5**

1934 was a record year.

Admission ratios per 1,000 of strength, British soldiers, since 1921 (*i.e.*, since the settled, post-war period began) may be contrasted thus :—

Best malarial years.		Worst malarial years.	
1928	91·3	1921	321·7
1932	84·1	1924	206·8
1934	67·5	1922	175·4

The 1934 figure is better than the previous best by no less than 16·6 per mille.

Although these are remarkable figures, yet it would be a big mistake to imagine that they are likely to be surpassed, or even maintained. The recent severe epidemic in south-west Ceylon, and the history of malaria in India itself warn us against premature optimism. Before exchanging caution for confidence, it is essential to consider, in a comparative way, all the important aetiological factors which may influence the incidence of this disease.

It is thought that examination of the statistics, coupled with comparative study of the aetiological factors, will tend to the opinion that, of late, a real and permanent improvement has occurred in the malarial situation in the Army in India.

Now and again disturbing influences may—and almost certainly will—arise to lower the present record incidence. For example, were financial stringency to become more intense, no doubt the anti-malaria grant would be still further reduced : were operations in the field to be undertaken during adverse weather conditions, the unpleasant experiences of 1933 would inevitably be repeated ; or if for some reason such as war, the supply of plasmoquine were interfered with or stopped, then the proportion and severity of the relapses would revert to the standards which existed prior to 1932.

However, such checks to progress are beyond medical control.

It is now proposed to set forth the grounds on which is based the belief that a real and permanent improvement has occurred ; and for this purpose the past three years, 1932-34, will be compared.

Periodicity of epidemic malaria is an important factor. In one of these years—1933—this factor was encountered in a severe form in the north-western sector of the country, where so many of our troops are stationed. There, a number of the garrisons suffered heavily ; and yet, the admission ratio per 1,000 was only 103·3 ; at that time, the third in order of merit since 1921.

Apart from periodicity, meteorological conditions are those which exercise the dominent influence in the incidence of this disease in India.

In 1934, and speaking generally, meteorological conditions were adverse. They presaged a comparatively heavy malarial toll.

In June the monsoon was somewhat late in appearing. Subsequently it became rapidly established, with well distributed rainfall over the country. Excessive rainfall in and near the Assam hills caused serious flooding of the Brahamputra. This month's fall, averaged over the plains, was in excess by 4 per cent.

In July rainfall was normal except in northwest India. Locally, very heavy rain fell in the hills of the east Punjab and the U. P., causing extensive floods in the Chenab, Beas, Sutlej, Indus and Rapti : that is, over an area containing many of the bigger cantonments. Averaged over the plains of India, the month's rainfall was in defect by 1 per cent.

In August the monsoon displayed normal activity over the whole country except in the northwest during the first three weeks, and over the Peninsula as far north as the Central Provinces during the last week of the month. Serious floods again occurred in well garrisoned areas, namely, in the valleys of the Ganges, Jumna, Gandak and Padma, with consequent water-logging in parts of the U. P., Bihar and east Bengal.

In September the monsoon was strong in the central parts of the country —where a number of fairly big garrisons are located—normal in Burma and northeast India, and weak elsewhere. Averaged over the plains, the month's fall was in excess by no less than 9 per cent.

In October the total rainfall was in large excess in southeast Madras slight to moderate excess in Upper Burma, Assam and Bengal : normal in Lower Burma and the east Central Provinces : slight to moderate defect in other parts of Bengal and Madras ; and in large defect elsewhere. Averaged over the plains of India, the month's rainfall was in excess by 2 per cent.

To summarise :—

The active period (June-September) of the monsoon of 1934, over the whole of India, yielded a rainfall which varied from normal to excess. In some areas the excess was great, and affected a number of important military localities.

In the transition period (October) rainfall was more or less in defect. Over some areas—including those in which the bulk of the troops are stationed —the defect was marked.

The meteorological review leads to the opinion that, in 1934, weather conditions were against a good malaria year.

In comparing annual incidences of malaria with annual meteorological conditions, there are, of course, a number of concomitant factors, the presence or absence of which must be taken into account. Periodicity of epidemic malaria has already been mentioned. Also, it must never be forgotten that, whereas in a particular year general meteorological conditions may be adverse locally they may be quite favourable : extensive areas may be heavily rained upon and flooded while cantonments in the same district may have the luck to escape. Then there is the factor of " carry-over " of cases. Unfortunately, the statistical year does not coincide with the true malarial year ; and any statistical year under review may have been preceded by a good or a bad malarial year. Its figures will be favourably or adversely affected accordingly. Finally, there must be taken into account the fortuitous factor, field service ; and also its allied condition, civil disturbance. The circumstances of war and of active internal policing are, by their nature, powerfully antagonistic to malarial prophylaxis.

In 1934 epidemic malaria did not occur. Local meteorological conditions, were generally adverse, and often markedly so. The " carry-over " from 1933 was fairly heavy. The position was not handicapped by war or civil disturbance.

Details regarding the corresponding factors in 1933 and 1932 may be studied in the War Office Reports on the Health of the Army (India section) for the appropriate years. They are shown below in tabular form. A plus

Acknowledgment is made to the Director of the Government of India Meteorological Department ; and to the Monthly Reviews and Annual Summary of Weather in India, published by his Department.

sign indicates that the factor was favourable to a good malarial year : the minus sign indicates that the factor was adverse.

	Epidemic malaria.	Weather conditions.	"Carry-over."	War and civil disturbance.
1932 . . .	+	—	—	—
1933 . . .	—	— — —	+	—
1934 . . .	+	— —	—	+

In itself, this rough picture is of no value ; but if its constituents be examined separately and compared, it will be seen, firstly, that expectation would have made 1933 a worse year than it actually turned out to be ; and secondly, that expectation would not have made 1934 as good as it turned out to be. There were grounds for forecasting that 1934 would be an improvement on 1933 ; but, on the above factors alone, there were no reasons for supposing that the 1934 figures would surpass those of 1932.

In the interests of prophylaxis, it is necessary to formulate an opinion as to why the 1934 statistics are so eminently satisfactory. The term "eminently satisfactory" is used purposely instead of "surprisingly satisfactory", because it is believed that certain comments and prognostications made in these Reports during the past three years have now been justified. These concern three additional factors, *viz.*, the effect of the new synthetic drugs, plasmoquine and atebrin : the improved standard of anti-malaria field work resulting from the training at Karnal : the re-awakening of interest, and the application of more scientific methods, amongst the clinicians.

As these matters have already been dealt with in recent Reports, it is only necessary to revert to them briefly now.

It is beyond doubt that quinine-plasmoquine, as used in military medical practice in India, results in a more radical and more rapid cure of malaria than does the administration of quinine alone. It is also beyond question that atebrin-plasmoquine effects a quicker cure than does quinine alone.

In certain cases quinine will continue to be more or less commonly employed : it has its advantages. In others atebrin and (or) plasmoquine are the drugs of choice—though it is not contended that these drugs, used singly or in combination, are complete and perfect remedies. They merely signalise a great step forward in malarial therapeusis.

How great that step is may be measured with a fair degree of accuracy, by comparing the total admission rates, on an all-India basis, from year to year : by studying the ratios of relapse to fresh cases ; and by noting the varied lengths of time deemed necessary to rid a patient's system of parasites, in accordance with the particular form of treatment prescribed.

Mention has already been made of the remarkable fall in the all-India admission ratio ; and it has been pointed out that this decline is not confined to the year under review. Even in a very bad year (1933) the ratio was much below expectation.

As regards the relapse rate, the following is an extract from remarks in an annual reports for 1934, made by a competent and reliable observer—a Deputy Assistant Director of Pathology, who is in charge of a District Laboratory :—

"It seems clear that fresh cases of malaria are very rarely, if ever, contracted in the military cantonments of the Madras District. A subpictus and *A. fuliginosus* have been identified in Madras and Bangalore, but none of the anophelines usually recognised as carriers.

Analysis of all the cases in the Q. V. O. Madras Sappers and Miners, Bangalore, the largest source of our malarial figures, shews that every case except one was admitted to hospital within a week of returning to Bangalore either from leave to his home, camp duty, or duty in frontier stations.

The treatment of these cases by plasmoquine and quinine or plasmoquine and atebrin, as per D. M. S. Circulars has been so successful that *there has been no relapse for 2 years in a total of 112 cases.* The absence of any possibility of local re-infection makes Bangalore very suitable for judging the results of treatment ".

If we pass from this to an area where re-infection within cantonment limits is an every-day occurrence, we find the Assistant Director of Hygiene and Pathology, Northern Command, remarking thus :—

" The Command relapse rate has fallen to 36·7. Many of the relapse cases were, however, the result of fresh infections contracted in 1933, during the Mohmand-Bajaur Operations ".

This is very different from the state of affairs which prevailed prior to the advent of the new drugs, when the relapse rate was customarily round about 90.

In this Report for 1933, it was shown that relapse rates vary according to therapeutic and nursing conditions ; and these conditions were classified under " specialised ", " selected " and " general practice ". Other things being equal, it may now be said, with confidence, that the following are conservative estimates of the relapse rates in these three classes—

" Specialised "	8 per cent. or under.
" Selected "	Average, 12 per cent.
" General practice "	Maximum 30 per cent.

If these figures are exceeded, there is some thing amiss with the treatment of the patients : an extraneous factor is at work, such as war, or the effects of war ; or re-infection is taking place.

In making a differential diagnosis, fresh or relapse, this question of re-infection is an extremely difficult one to settle ; and especially so in that area—the Punjab and the frontier—from which so much of the Army malaria comes. (The conditions in Bangalore are very exceptional). However, it is not for this reason that the table showing fresh and relapse cases, by Commands, has been omitted from this year's Reports : the omission is due to the following circumstances :—

In order to make the case against the new synthetic drugs as black as possible—in order to eliminate personal prejudice in their favour—it was decided that *all* admissions subsequent to a primary admission should be regarded as relapses : that the question of re-infection should not be considered at all. The results were disappointing : quite early in the malaria season it became plain that many cases labelled relapses were, in fact, re-infections.

The issue was further complicated by the fact that, in Waziristan District, and throughout Southern Command, an experiment on a big scale was in progress, with the object of shortening the quinine-plasmoquine course of treatment. In the above area, this course was cut down from the routine period of 21 days, to 14 days.* This must have resulted in the inclusion of a

* See this Report for 1933, pages 111-112.

still bigger percentage of re-infections, under the heading of relapse—particularly in the case of Waziristan where (as in the rest of Northern Command) the risk of re-infection during the malaria season is abnormally high : very much higher than in Southern Command.

Despite the unfair weightage above described, the relapse (sic) percentages were well below expectation, and much below those met with in the days before the new drugs were brought into use. In Southern Command the percentage was 25 ; in Waziristan District, 40 ; and over all-India, 36.

In the forthcoming malaria year, it is not proposed to continue the short 14-day course of quinine-plasmoquine in Waziristan District and Southern Command ; and it is not intended to fetter the diagnostic discretion of medical officers in the matter of relapse *versus* re-infection. It is confidently anticipated that these changes, will result in a marked improvement in the fallacious relapse percentages of the year under review.

Improvement in the standard of field work continues, as more and more Karnal-trained officers become available. Nevertheless, supply does not equal demand, for qualified officers of the Royal Army Medical Corps return to England from time to time, tour-expired ; and those of the Indian Medical Service are not infrequently transferred to the civil side, their services thereby being lost to military. It would be of great benefit to the Army if more military medical officers could be trained annually at the Ross Field Experimental Station for Malaria, Karnal.

Finally, mention must be made of the clinicians, to whom too little credit for the improved malarial statistics has been awarded in recent years. The Medical Specialists in particular have devoted much time and attention to the therapeutics of the disease ; and their investigations and reports thereon indicate a big advance in scientific outlook and practice.

Of other aspects of the anti-malaria problem there is little fresh to be said. As mentioned in these Reports for 1932 and 1933, finance was subject to a severe " cut " in 1932. This " cut " still remains in force. So, too, does the decision arrived at in September, 1931, that ; " In view of the present financial stringency, no further new works in the direction of mosquito-proofing of buildings should be undertaken until the financial situation is more normal ".

In connection with mosquito-proofing, a curious and instructive incident occurred at Allahabad. Owing to the fact that most of the malaria contracted in that station was traceable to garrison duty in the old fort, it was decided to proof the buildings. The work was completed in January, 1930, at a cost of a little over £1,350.

The admission ratio *per mille*, for malaria at Allahabad, averaged over the years 1925 to 1931, was 109. In 1932 it was 49 ; and in 1933, 40.

In May, 1934, the whole fort was denuded of its mosquito-proofing. This measure was carried out at the instance of the local authorities, after sanction had been obtained from Command Headquarters. The reasons put forward in support of this retrograde step were, that the netting shut out light, interfered with ventilation, and collected dust and debris to such an extent that cleaning became impossible.

In 1934 the admission ratio rose to 120 *per mille*.

At this stage it is not considered desirable to comment on this matter, because the monsoon of 1934 at Allahabad was unfavourable. But at least the incident has afforded a valuable lesson, to wit : that the proofing of old barracks should not be undertaken without serious consideration. The

original design and construction of these old buildings may not lend themselves to this measure.

List of stations with strengths of over 500 in which malaria incidence exceeded 100 per 1,000 (the all-India ratio being 67·5) :—

TABLE No. 16.

Peshawar . . .	192	Nasirabad . . .	153
Quetta. . . .	172	Allahabad . . .	120
Delhi	169	Mhow	101

In the case of Indian Troops, the six worst stations with strengths of over 1,000 were :—

TABLE No. 17.

Wana	492·4	Jhelum . . .	238·1
Fort Sandeman . .	465·9	Rawalpindi . . .	192·4
Peshawar . . .	279·2	Landikotal . . .	178·8

The Indian all-India ratio was approximately 155.

Once more Lahore Cantonment (British)—a station which is almost completely mosquito-proofed—remains out of this table. " In this notorious station the average annual malarial incidence for the five years 1923—27 was 743. Proofing was carried out in 1927—30. The average annual incidence 1928—33, was 124 ". (See this Report for 1933).

In 1934 the incidence was 43.

Between the years 1902 and 1908 this cantonment was subjected to a very intensive and expensive anti-malaria campaign. However, the disease did not decline ; and even a change of name (in 1906) from " Mian Mir " to " Lahore Cantonment " produced no amelioration of the incidence of malaria. In the days of Akbar and Jehangir, Mian Mir was a religious teacher and preacher of great sanctity and renown and it would now seem as if the time had arrived to revert to the ancient name. The memory of this fine old saint was permitted to be extinguished because of a medical failure. It is but right and proper to make amends, and restore him to memory, now that Medicine has triumphed.

Further investigations have been carried out regarding the effects of " cold storage ". As was indicated in the Report for 1933, this measure is nothing like as effectual as, originally, it promised to be. For instance, the following question was put to Northern and Eastern Commands :—

" What is the ratio per 100 of all British troops in the command who benefitted by the measure known as " cold storage ", during 1934 ? By " benefitted " is meant residence in a hill station for the four months, 1st July to 31st October, inclusive. "

The answers are given below :—

Northern Command—		Eastern Command—	
Peshawar District . .	128	Meerut District . .	427
Rawalpindi District . .	33	Lucknow District . .	272
Lahore District . . .	269	Presy. & Assam District	248
Waziristan District . .	793	Delhi Brigade Area .	240

In a way, these figures are a measure of the facilities at the disposal of administrative authorities for placing the troops in the Hills. In Peshawar District these facilities are poor in Waziristan and Meerut Districts they are comparatively ample. The Rawalpindi figure is very low because, in that District, the bulk of the troops have moved down to the plains before 31st October. If 30th September had been substituted for 31st October, the ratios would have been better all round ; but primary malaria is common in the plains during October ; and often this is the worst month of the year. Men who are in the plains in October cannot obtain the full benefit of " cold storage."

It amounts to this, then, that in the two most malarious commands, and for the reasons mentioned in last year'sReport, only about twenty-five per cent. of the troops enjoy the full benefit of this measure.

Ratios of women and children who are deprived—voluntarily or otherwise—of the full benefit of " cold storage ", are not at present available ; but whether from choice or compulsion, it is certain that the actual number of women who remain in the plains during the hot weather are considerable. This is reflected in the vital statistics, Northern Command, 1934. Whereas the troops' statistics show an all round improvement, those of the women and children indicate a deterioration. This deterioration is most evidenced in the ratios of admissions and invalidings, and in the malaria incidence. Lack of accommodation in the hills is the difficulty. It is computed that, in one command alone, the number of women who wished to go to the hills, but for whom no accommodation could be found, amounted to something like one thousand. Considering the risks run by these women during the hot weather, this big figure must be regarded with misgiving.

One of the most encouraging feature of the year 1934 was the interest shown here and there by authorities other than military in the anti-malaria problem. With the exception of Quetta, this interest was neither intense nor financially adequate ; but a beginning has been made, and it is hoped that, from this, the participation of civil and municipal authorities in the anti-malaria fight will develop.

In 1933 there occurred, in connection with malaria, 10 cases of haemoglobinuria, with 6 deaths*. In 1934 there were 3 cases, with 1 death †. Of the two patients in 1934 who recovered, one was a sepoy in Muttra who had received atebrin, 0·1 gm. thrice daily for 7 days, followed by 0·01 gm. plasmoquine twice daily for two days. The pigment present in the urine was reported to be methaemoglobin. Rapid recovery followed appropriate treatment, including stoppage of plasmoquine. The second case was that of a British soldier who was enlisted in India, *and who had never resided out of the country.* The case occurred at Lahore. He had received atebrin, 0·1 gm. thrice daily for 7 days, followed by 0·03 gm. (in two doses of 0·01 and 0·02 gm. respectively) daily, for three days. In this case oxyhaemoglobin was reported. Recovery followed suitable treatment.

Although malaria remains the scourge of the British Army in India, the portents—as measured by sustained, if gradual, progress—are encouraging.

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*Jl. Royal Army Med. Corps, 1934. Mar., Apr., May. Vol. 62.

† *Ibid,* 1935. Feb. Vol. 64. (The fatal case only).

Mental Diseases.

12. Actual admissions were 152, giving a *per mille* ratio of 2·8, as compared with 3·5 in 1933.

Small-pox.

13. Half-yearly vaccination state of British troops and families.

TABLE No. 18.

	Percentage protected.*	
	On 31st March.	On 30th September.
British officers	99·00	98·33
British Other Ranks	99·18	99 14
Wives and Children	99·23	99·01

The following sporadic cases occurred in the course of the year :—

Officers	1
Officers' wives and children	
Other ranks	6
Other ranks' wives and children	3

14. Tuberculosis.

TABLE No. 19.

	Pulmonary Tubercle.	Tuberculosis of organs other than the lungs.	Pulmonary tubercle.
	Actuals.	Actuals.	Ratio per 1,000.
Admissions	56	8	1·0
Deaths	1	1	0·02
Invalids	51	10	0·94

These figures are much the same as those for 1933.

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* That is—

(*a*) has been successfully vaccinated within the last five years, or

(*b*) shows evidence of immunity by 3 unsuccessful vaccinations (carried out at intervals of one month) within the last five years.

(*c*) bears distinct marks of small-pox.

Venereal Diseases.

15. The following is a list of the bigger stations in which admissions exceeded 50 per 1,000 :—

TABLE No. 20.

Station.		Ratio
Mingaladon	(Burma District)	91·2
Madras	(Southern Command)	82·0
Barrackpore	(Eastern Command)	78·1
Delhi	(Eastern Command)	70·0
Maymyo	(Burma District)	65·5
Dacca	(Eastern Command)	60·8
Bombay	(Southern Command)	59·8
Allahabad	(Eastern Command)	56·3
Kamptee	(Southern Command)	55·8
Bangalore	(Southern Command)	52·3

The all-India ratio was 34·1, as compared with 33·4 in 1933.

Diseases of the Respiratory System.

16. Actual admissions were 1,185, giving a *per mille* ratio of 21·8. In 1933 this ratio was 21·8.

Acute and chronic bronchitis, and catarrhal pneumonia accounted for 811 admissions, with 3 deaths and 6 invalidings. There were 90 cases of pleurisy, and 46 of laryngitis.

Lobar pneumonia.

TABLE No.

	1934.	1933.
Actual admissions	176	142
Admission ratio per 1,000	3·2	2·6
Actual deaths	9	11
Case mortality per cent.	5·1	7·7
Actual invalids	4	6

Diseases of the Digestive System.

17. Admissions again showed a decrease : 5,582 in 1934 as against 5,670 in 1933. They included :—

TABLE No. 22.

Tonsillitis	1,696	Appendicitis	475
Diarrhœa	811	Pharyngitis	441
Jaundice	397	Constipation	346
		Gastritis	342

Diseases of the Areolar Tissues, and Local Injuries.

18. Once more these two groups accounted for much hospitalisation.

In the former, admissions totalled 2,835, with a ratio per 1,000 of 52·1. There were 2,335 cases of cellulitis and 452 of boils.

In the latter, admissions amounted to 3,391, with 27 deaths, giving ratios per 1,000 of 62·3 and 0·50 respectively. The injuries included sprains, contusions and abrasions, 1988: wounds 322: gun-shot wounds, 41: fractures, 658, and dislocations 101.

Effects of Heat.

19. Comparatively speaking, 1934 was a good year for British troops in India. Admissions numbered 90, and deaths 9, with ratios per 1,000 of 1·7 and 0·2 respectively. There were 11 cases of heatstroke, and 77 of heat exhaustion. All these figures are below those of 1933.

Sanitary Engineering.

20. *Water Supplies.*—During the year under review further new works and improvements to water supplies have been carried out and others initiated. There are, however, still many stations in which, owing to financial stringency it has not yet been possible to provide piped water supplies.

Chlorination (and in at least one case rapid mechanical filtration) has been provided as funds have permitted; and, in the majority of piped water supplies, treatment is now carried out by the Military Engineer Services under the supervision of medical authorities, who give the necessary instructions.

Data are still being accumulated and experiments carried out to obviate taste troubles resulting from treatment and from the preservative covering of tanks and pipes.

Electric lighting and ventilation.—Further progress has been made in providing electric lighting in military cantonments, and nearly all plains stations where British troops are quartered are now illuminated electrically and provided with electric fans or electrically driven punkhas. An attempt is being made to standardise the latter equipment, and a considerable advance has been made in ensuring noiseless operation. An emometer experiment shows that if the equipment can be made absolutely reliable, it provides a much more efficient method of "air" circulation in normal barrack rooms for equal initial and recurring cost than do fans. By standardisation facilitating immediate replacement of parts, it is hoped to ensure that reliability.

It has not yet been possible to provide Indian troops lines with electric lighting, except in a few special cases chiefly on the Frontier.

Hill stations with one or two exceptions are not yet provided with electric lighting.

Air conditioning.—While the provision of proprietary equipment even in hospitals appears prohibitive in cost, experiments have been initiated to determine whether the authorised capacity of fan equipment may not be more efficiently employed than at present, in conjunction with, and to augment the natural draught from open windows or, *when climatic conditions are favourable* from *khas khas* tatties.

Hot water installations.—The installation of piped hot water installations has been authorised in hospitals, British Troops Barracks and in Officers' Quarters.

Tree planting and maintenance.—The planting and maintenance of trees and hedges has been authorised on all land in M. E. S. charge. This should be specially valuable in plains stations.

Cement concrete floors.—The embargo that was placed, as an economy measure, on provision of cement concrete floors in Indian troops barracks and quarters has been lifted, except in the case of followers' quarters.

21. Radiology.

TABLE No. 23

No. of patients examined		British	13,644
		Indian	7,525
		Civilian	1,546
No. and nature of examinations carried out.	Bones and Joints	Injury	14,198
		Disease	2,105
		Sinuses	788
	Teeth		955
	Lungs		2,414
	Heart		199
	Gastro intestinal		466
	Liver and gall bladder		352
	Urinary tract		830
	Genital tract		82
	Miscellaneous		414
	Foreign body		67
	Pregnancy		66
Cases in which a contrast medium was used and nature of medium.		Barium	602
		Shadacol	107
		Uro-selectan B and lipiodol	78
Miscellaneous information	No. of ordinary films used		33,486
	No. of dental films		3,489
	No. of exposures		46,170
	No. of prints		85
	No. of screen examinations		1,153

Dental Treatment.

22. Comparative summary of dental treatment carried out during the year 1934 for British Troops in India (including Royal Air Force) and excluding families.

TABLE No. 24.

Year.	No. inspected.	No. selected for treatment.	No. for whom treatment was completed.	No. of teeth extracted.	No. of teeth conserved including root treatment.	Sealings completed.	Treatment for Gingivitis, stomatitis and pyorrhoea.	New dentures supplied.	Dentures remodelled and repaired	Appliances for jaw injuries.
1933. . .	19,979	15,118	15,766	14,879	33,650	6,112	752	867	439	24
1934. . .	26,818	17,215	18,217	14,244	36,673	6,473	632	829	481	16

23. Military Food Laboratory.

Summary of work carried out during 1934.

TABLE No. 25.

Source of sample.	Number of samples received.	Accepted.	Rejected.	Percentage of rejections.
On offer or for acceptance.				
Direct from overseas . .	346	287	59	17·1
Indian products . . .	620	420	197	31·8
Grains from grain depots .	2,688	2,585	103	3·8
Wheat products from controlled mills	600	600	..	..
Bran from other controlled mills	855	790	65	7·6
Ghi	4,832	4,832	..	..
From I. A. S. C. stocks for periodical analysis . .	1,488	1,452	36	2·4
From units on complaint or for advice	1,978	1,535	368	18·6
Total .	13,407	*12,501	*828	6·2

* The remainder of the samples received represent special examinations, including 74 of drinking water.

24. Surgical Specialist's Report, 1934.

Table No. 26.

Operations performed during the year on :—

Region of the body operated upon.	British Officers.				British Other Ranks.				British Women and Children. (Officer's and Other Ranks.)			
	Number.	Recovered.	Invalided.	Died.	Number.	Recovered.	Invalided.	Died.	Number.	Recovered.	Invalided.	Died.
Head and neck . .	52	52	...	...	413	414	1	3	106	105	...	1
Thorax . . .	3	3	...	...	40	38	2	...	9	9	...	...
Abdomen . . .	71	68	...	3	553	526	8	19	140	134	2	4
Superficial operation on trunk . .	58	58	...	...	598	598	...	...	108	107	1	...
Upper extremity . .	49	48	1	...	490	488	2	...	46	45	...	1
Lower extremity . .	68	63	5	...	730	719	10	1	29	29	...	...

SECTION II.

ON THE HEALTH OF THE INDIAN ARMY DURING 1934.

(From the Director, Medical Services in India.)

25.—GENERAL.

TABLE A.

	Average strength.	Admissions. No.	Admissions. Ratio per 1,000.	Deaths. No.	Deaths. Ratio per 1,000.	Invalids sent to United Kingdom. No.	Invalids sent to United Kingdom. Ratio per 1,000.	Invalids discharged in India. No.	Invalids discharged in India. Ratio per 1,000.	Average constantly sick. No.	Average constantly sick. Ratio per 1,000.
Officers	2,097	703	335·2	9	4·29	6	2·86	...	...	23·35	11·13
Indian Ranks	117,276	54,335	456·8	250	2·10	...	...	669	5·62	1,919·39	16·14
Followers	26,744	7,692	287·6	120	4·49	...	...	107	4·00	279·29	10·44
Others *	...	2,559	...	32	...	...	...	89	...	...	...

The health statistics of officers and Indian ranks for the quinquennial periods 1920-24 and 1925-29 with those for 1930, 1931, 1932, 1933 and 1934 are given separately in the following table for purposes of comparison.

TABLE B.

Period.	Ratio per 1,000. Admissions. King's Commissioned officers.	Admissions. Indian ranks.	Invalids. King's Commissioned officers.	Invalids. Indian ranks.	Deaths. King's Commissioned officers.	Deaths. Indian ranks.
1920-24	698·3	593·2	3·65	18·25	6·67	3·01
1925-29	498·0	385·6	5·22	10·80	4·74	3·48
1930	313·7	417·9	16·42	6·23	5·47	3·16
1931	367·4	451·3	14·73	8·73	5·52	2·96
1932	321·8	429·8	11·95	6·47	6·90	2·52
1933	345·5	510·9	16·41	5·68	4·69	2·39
1934	**335·2**	**456·8**	**2·86**	**5·62**	**4·29**	**2·10**

OFFICERS.

26. The admission rate of officers sick in hospital for 1934 is 335·2 per 1,000 of strength as compared with 345·5 in 1933.

The principal causes of sickness were :—

TABLE C.

Diseases.	Actuals.	Ratio per 1,000.	Increase or decrease as compared with 1933. Increase.	Decrease.
Local Injuries	97	46·3	2·2	..
Malaria	79	37·7	..	8·2
Dysentery	48	22·9	12·6	..
Minor septic diseases	44	21·0	..	7·6
Tonsillitis	36	17·2	..	0·1
Ear and Nose	34	16·2	7·3	..
Diseases of Bones, Joints, Muscles, Fasciae and Bursae	29	13·8	4·0	..
Sandfly fever	26	12·4	..	4·9
Influenza	25	11·9	..	1·7
Diarrhœa	22	10·5	..	2·2

* Includes Reservists, Indian Territorial Force, Royal Indian Marine, Indian States Forces, R. A. F., Civilians and Pensioners.

There were 9 deaths of which 3 were due to Injuries, and 6 to other diseases (Septicaemia 2, abscess of the brain, Lobar pneumonia, Appendicitis and Nephritis one each).

SOLDIERS.

27. 54,335 or 456·8 per 1,000 of the strength, were admitted to hospital, compared with 510·9 in 1933. There is thus a decrease of 54·1 per 1,000 compared with the 1933 figures.

The principal causes of admissions to hospital were :—

TABLE D.

Diseases.	Actuals.	Ratio per 1,000.	Increase or decrease as compared w th 1933. Increase.	Decrease.
Malaria	18,353	156·5	..	55·7
Local Injuries	5,832	49·0	0·8	..
Minor septic diseases	4,060	34·6	1·9	..
Pharyngitis	2,529	21·6	3·2	..
Bronchitis	1,680	14·3	1·1	..
Dysentery	1,632	13·9	..	1·4
Scabies	1,317	11·1	2·3	..
Influenza	1,234	10·5	..	0·5
Venereal diseases	1,130	9·6	..	1·2
Sandfly fever	970	8·3	..	2·1
Mumps	953	8·1	2·5	..
Conjunctivitis	766	6·5	0·7	..
Rhinitis	745	6·4	..	1·0
Diarrhœa	742	6·3	..	1·6
Pneumonia (Lobar and Lobular)	704	6·0	..	0·2
Tonsillitis	637	5·4	..	0·6
Common Cold	559	4·8	2·6	..
Indigestion	440	3·8	..	0·3
Ankylostomiasis	381	3·2	0·2	..
Constipation	373	3·2	..	0·9
Synovitis	372	3·2	..	0·7
Dermatitis	351	3·0	..	..
Jaundice	313	2·7	..	0·4
Dengue	288	2·5	0·4	..
Otitis media	277	2·4	..	0·2
Eczema	271	2·3	0·2	..
Ring Worm	264	2·3	0·5	..
Myalgia	260	2·2	..	0·2
Dracontiasis	225	1·9	0·1	..
Enteric group of fevers	224	1·9	..	0·2
Pleurisy	208	1·8	..	0·1
Pulmonary tuberculosis	212	1·8	0·1	..
Piles	205	1·7	..	0·5
Appendicitis	182	1·6	0·5	..
Trachoma	180	1·5	0·2	..
Keratitis ulcerative	162	1·4	..	..
Colic	138	1·2	..	0·1
Measles	131	1·1	..	0·4

The death rate has fallen to 2·10 per 1,000 as compared with 2·39 in 1933, thus showing a decrease of 0·29 per 1,000 on the rate of 1933.

The main causes of deaths were :—

TABLE E.

Diseases.	Actuals.	Ratio per 1,000.	Increase or decrease as compared with 1933. Increase.	Decrease.
Pneumonia (Lobar and Lobular)	58	0·49	..	0·27
Local Injuries	44	0·37	0·17	..
Digestive diseases	26	0·22	0·15	..
Enteric group of fevers	15	0·13	..	0·07
Meningococcal infection	15	0·13	..	..
Circulatory	14	0·12	..	..
Pulmonary tuberculosis	8	0·07	..	0·04
Nervous diseases	8	0·07	..	0·01
Urinary diseases	7	0·06	0 01	..
General injuries	6	0·05	..	0·06
Dysentery	6	0·05	0·03	..
Malaria	6	0·05	..	0·01
Other respiratory diseases	6	0·06	..	..
Tuberculosis (other than Pulmonary)	5	0·04	0·01	..
Tumours	4	0·03	0·02	0·03

There is a fall in the invaliding rate of 0·06 per 1,000.

The principal causes of invaliding were :—

TABLE F.

Diseases.	Actuals.	Ratio per 1,000.	Increase or decrease as compared with 1933. Increase.	Decrease.
Pulmonary tuberculosis	192	1·61	0·02	..
Injuries	94	0·79	..	0·12
Diseases of Bones, Joints, Muscles, Fasciae and Bursae	46	0·39	..	0·07
Diseases of the eye	41	0·34	..	0·03
Diseases of the nervous system	41	0·34	0·04	..
Mental diseases	40	0·34	0·05	..
Circulatory diseases	33	0·27	0·11	..
Other tubercular diseases	31	0·26	..	0·02
Respiratory diseases (other than Pneumonia and Pulmonary tuberculosis)	28	0·24	..	0·02
Diseases of Ear and Nose	18	0·15	0.01	..
Digestive diseases	15	0·13	..	0·07
Venereal diseases	8	0·06	..	0·01
Dracontiasis	7	0·06	0·02	..
Malaria	7	0·06	0·01	..
Rheumatic fever	7	0·06	0·02	..
Diseases of blood	7	0·06	0·03	..
Diseases of Lymphatic system	6	0·05	..	..
Leprosy	6	0·05	..	..
Diseases of Skin	5	0·04	..	..

The average number constantly sick in hospital was 1,919·39 or 16·14 per 1,000 of the strength, compared with 17·11 in 1933.

The average sick time to each soldier was 5·97 days, and the average duration of each case 12·89 days; the corresponding figures were 6·24 and 12·2 in 1933.

155,465 men, or 1,325·6 per 1,000 of the strength, were treated as out-patients compared with 1,391·4 per 1,000 in 1933. The average daily number under treatment in barracks was 2,148·32 or 18·32 per 1,000 compared with 19·32 per 1,000 in 1933.

The combined ratio constantly sick in hospital and under treatment as out-patients was 34·46 per 1,000 of the strength, compared with 36·43 in 1933.

The above represents a loss of 700,577 men days in hospital and 784,137 men days treated in barracks or a total loss of 1,484,714 men days in the year.

TABLE.

Table showing admission and death ratios per 1,000 of the strength for all causes and certain

Stations with *total* admission ratios, all causes, higher than all-India.

Stations.		Wana.	Jhelum.	Fort Sandeman.	Bannu.	Razmak.	Peshawar.	Lahore.	Jubbulpore.	Rawalpindi.	Nowshera.	All India.
Strength . . .		2,892	2,205	2,211	2,157	4,759	5,506	2,318	2,168	4,272	4,083	117,276
All Causes .	A.	840·2	702·0	686·6	600·8	569·2	540·1	513·4	511·5	488·3	478·6	456·8
	D.	3·11	3·17	0·90	1·85	1·89	2·01	1·73	2·17	2·34	3·01	2·10
	Av.	23·87	20·03	16·54	19·48	19·53	21·19	18·21	14·12	17·47	12·89	16·14
	C.S.											

Analysis of the above *total* admission rates.

Malaria . .	A.	492·4	238·1	465·4	171·5	139·9	279·3	99·7	80·3	194·3	192·0	156·5
	D.	...	...	...	...	...	...	0·43	...	...	...	0·05
Sand-fly fever .	A.	0·7	2·7	16·3	35·7	0·6	23·8	38·4	...	19·7	4·4	8·3
	D.	..	..	..	..	..	..	..	..	..	..	..
Enteric Group .	A.	0·3	1·8	0·4	3·3	2·1	0·6	0·9	2·8	1·2	1·6	1·9
	D.	..	..	...	0·46	0·42	...	...	0·46	0·23	...	0·13
Dysentery .	A.	15·9	28·6	5·4	9·8	11·2	11·4	7·4	24·4	20·0	9·5	13·9
	D.	0·35	..	..	..	..	..	...	..	..	..	0·05
Diarrhœa .	A.	1·0	11·3	10·4	4·6	6·1	9·6	19·8	3·2	6·6	5·1	6·3
	D.	..	..	..	..	..	..	..	..	..	..	..
Influenza .	A.	3·1	47·6	15·4	12·5	5·3	2·4	58·2	43·8	6·3	39·7	10·5
	D.	..	..	..	..	..	..	...	..	..	..	0·01
Pneumonia Lobar & Lobular.	A.	7·3	10·9	5·4	8·8	6·7	8·9	11·2	2·3	10·1	6·4	6·0
	D.	0·35	0·91	0·45	0·46	0·63	0·36	0·43	0·46	1·17	0·99	0·49
Venereal diseases	A.	4·1	4·5	3·6	9·3	7·1	12·0	11·2	1·8	7·0	3·7	9·6
	D.	..	..	..	..	..	..	..	..	..	0·25	0·03
Minor septic .	A.	53·9	58·0	14·5	58·4	37·6	29·2	41·8	84·4	28·8	29·3	17·5
	D.	..	..	..	..	..	..	..	..	..	..	..
Local Injuries .	A.	78·8	54·0	40·3	77·1	60·3	37·8	64·3	61·8	51·3	60·1	49·0
	D.	1·73	0·91	..	..	..	0·36	0·43	..	0·23	0·74	0·37
Heat-stroke .	A.	..	..	..	..	..	..	..	..	..	..	...
	D.	..	..	..	..	..	..	..	..	..	..	..
Heat-exhaustion	A.	...	0·5	..	..	..	0·2	2·6	..	..	2·0	0·2
	D.	...	..	..	..	...	..	..	..	..	..	...
Ankylostomiasis	A.	11·1	0·9	3·2	4·6	4·0	2·0	1·3	2·3	4·7	3·2	1·6
	D.	..	..	..	..	..	..	..	..	..	..	0·00
Pulmonary tuberculosis.	A.	2·1	2·3	2·3	2·8	2·1	1·1	2·6	0·9	3·0	2·0	1·3
	D.	..	..	..	..	..	..	0·43		..	...	0·07

G.

important diseases for stations with a strength of 2,000 and upwards compared with all-India.

Stations with *total* admission ratios, all causes, lower than all-India.

Meerut.	Abbottabad.	Ferozepore.	Sialkot.	Bangalore.	Dehra Dun.	Ambala.	Quetta.	Kohat.	Jullundur.	Poona.	Trimulgherry.
2,460	3,884	2,010	2,049	2,418	2,143	2,321	6,773	4,126	2,027	4,082	3,011
456·5	433·1	428·9	424·1	407·8	406·0	373·5	372·7	366·7	339 9	292·5	277·3
5·28	3·35	4·48	2·93	1·24	0·47	1·72	2·36	1·70	1·48	2·20	1·33
19·97	14·09	14·08	17·28	19·62	17·95	14·05	15·42	15·47	12·66	12·00	14·98

Analysis of the above *total* admission rates.

85·4	169·7	112·4	95·7	28·1	126·0	101·7	144·7	142·8	117·9	67·6	18·3
...	0·51	...	...	...	...	...	...	...	0·49	...	...
4·9	9·8	11·9	...	...	..	6·0	0·6	8·7	4·4	...	0·7
...	...	...	...	...	...	...	...	...	...	...	...
4·0	2·8	1·5	...	1· 6	1·4	1·2	3·2	2·7	2·0	1·6	1·0
...	0·26	...	...	...	...	0·86	...	...	...	0·24	...
17·5	8·5	8·0	8·3	8·3	13·1	12·5	37·8	14·0	10·4	18·0	26·2
0·41	...	...	...	...	...	...	...	...	...	0·24	...
8·5	12·6	5 5	11·2	8·3	6·1	3·4	1·9	1·7	1·0	2·9	6·3
...	...	...	...	...	...	...	...	...	...	...	...
...	1·5	..	...	7·9	2·3	6·9	...	...	7·4	0·2	2·3
...	...	...	...	...	...	...	...	...	...	...	...
6·9	5·7	12·4	6·3	3·7	4·7	8·6	5·2	7·0	4·4	3·4	2·7
1·22	0·51	2 49	0·49	0·41	...	...	0·44	0·48	...	0 24	...
13·0	8·2	9·9	5· 9	16·5	11·2	6·5	5·3	6·3	6·4	18·4	10·6
...	...	0 50	...	...	...	...	...	...	...	...	...
40·2	25·5	55·7	36·6	76·1	46·7	32·3	13·4	37·6	35·5	20·1	14·6
...	...	...	...	...	...	...	...	...	...	...	...
68·7	43·3	46·3	67·8	74·0	38·3	49·5	28·2	42·9	50·8	34·1	57·1
...	...	0·50	0 98	...	...	...	0·59	...	...	0·73	0 66
...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...
...	0·3	...	...	...	...	...	...	0·2	...	...	0·3
...	...	...	..	...	...	...	...	...	...	...	...
5·7	3·6	6·5	2·4	...	4·7	2·6	5·6	1·5	3·5	2·7	2·7
...	...	...	...	...	...	...	...	...	...	...	...
1·2	1·3	2·0	2·9	...	2·3	2·2	0·6	1·9	1·5	1·2	0·7
...	0·26	0·50	0·49	...	...	...	0·15	...	...	...	...

The general statistics show that, for the Indian Army, 1934 was an unusually healthy year.

PRINCIPAL DISEASES AFFECTING THE INDIAN ARMY.

Cerebro-spinal Meningitis.

28. 38 cases occurred among Indian Troops of which 15 died, giving a case mortality of 39·5 per cent. Comparative figures for the last 5 years can be found in Table No. 5 in the section of the report dealing with British Troops. While the increased incidence, corresponding with a similar state of affairs in the civil population, is disquieting, it is satisfactory to note the improvement in the case mortality, which is in part at least referable to earlier and more vigorous treatment.

Dengue.

29. 288 cases are included under this heading giving a ratio of 2·5 per 1,000 compared with 2·1 in 1933. The majority of the cases occurred in Burma. The stations principally affected were :—

	Actuals.	Ratio per 1,000.		Actuals.	Ratio per 1,000.
Mingaladon . .	140	178·8			
Madras . . .	46	83·9	Alipore . . .	12	14·6
Mandalay . .	58	71·5	Bangalore . .	18	7·4

Dysentery, Diarrhœa and Colitis.

30. Admission and death ratios for Dysentery, Diarrhœa and Colitis for the year 1913, and for the last 10 years is shown in Table H.

TABLE H.

Years.	Dysentery.		Diarrhœa.		Colitis.		Combined.	
	A.	D.	A.	D.	A.	D.	A.	D.
1913 . .	11·7	0·09	13·7	0·01	4·5	..	29·9	0·10
1925 . .	6·5	0·03	13·8	..	5·5	..	23 8	0·03
1926 . .	10·6	0·02	14·0	..	0·3	..	24·8	0·02
1927 . .	11·6	0·08	10·8	..	0·2	..	22·6	0·08
1928 . .	12·1	0·05	11·4	0·01	0·3	0·1	23·8	0·06
1929 . .	14·4	0·05	10·2	..	0·4	..	25·0	0·05
1930 . .	19·7	0·09	8·0	..	0·3	..	27·9	0·09
1931 . .	16·7	0·03	7·6	..	0·2	..	24·6	0·03
1932 . .	16·7	0·02	6·4	..	0·2	..	23·3	0·02
1933 . .	15·3	0·02	7·9	..	0 3	..	23·5	0·02
1934 . .	**13·9**	**0·05**	**6·3**	..	**0·2**	**0·02**	**20·5**	**0·07**

There were 2,402 admissions for this group of diseases, a decrease of 365 cases.

The admissions for various types of dysentery during the past 8 years are shown below. As for British troops in 1931, the cases with Bacillary exudates have been included in the Bacillary Group.

	1927.	1928.	1929.	1930.	1931.	1932.	1933.	1934.
Amoebic Dysentery .	205	77	116	213	124	251	96	80
Bacillary Dysentery .	346	481	810	1,628	1,435	1,371	1,297	1,161
Clinical Dysentery .	992	1,032	935	680	512	398	411	391

The percentage of the different types of dysentery in 1934 were :—

Dysentery amoebic	4·90
Dysentery bacillary	71·14
Dysentery clinical	23·96

The majority of the cases of dysentery were mild, and in all only 6 deaths occurred in 1,632 cases, the percentage death rate of admissions being therefore 0·36 per cent.

The distribution of the various forms of dysentery by commands is shown below in ratios per 1,000 of strength :—

TABLE I.

	Dysentery.			
	Amoebic.	Bacillary (bacteriologically proven).	Bacillary exudate.	Clinical.
Northern Command	0·2	4·5	3·4	4·2
Western Command	0·5	11·3	7·6	4·4
Eastern Command	1·6	4·0	3·2	2·8
Southern Command	0·8	6·8	6·5	1·4
Burma District	2·3	4·5	1·0	1·0

Enteric Group of Fevers.

31. There were 20 cases less than in 1933, giving a ratio of 1·9 admissions per 1,000 of strength, against 2·1 in 1933.

There were 15 deaths among the 224 admissions or 6·70 per cent. and a death rate of 0·13 per 1,000 of strength as compared with 0·20 in 1933.

Other points of interest regarding these fevers have been discussed at length in the section of the report dealing with British troops.

The inoculation state of the troops is good. In September when the last return was rendered, the figures were as follows :—

TABLE J.

	British officers attached to Indian Units.	Indian ranks.	Followers.
Strength	1,993	123,565	27,081
Number protected . . .	1,820	121,735	26,572
Number unprotected	173	1,830	509
Percentage protected	91·32	98·52	98·12

The relative incidence and deaths among protected and unprotected cases of Indian Ranks are shown below. The figures representing protected and unprotected are obtained by making an average of the two half-yearly returns and represent therefore an approximate and not an actual figure. The figures regarding incidence and death are taken from special report forms rendered regarding enteric fever.

TABLE K.

	Strength.	Actuals.		Ratio per 1,000		Case mortality per cent.
		Cases.	Deaths.	Cases.	Deaths.	
Protected . .	119,854	203	13	1·7	0·11	6·40
Unprotected . .	2,011	21	2	10·4	0·99	9·52

Malaria.

32. The admissions for all forms of malaria totalled 18,353 with 6 deaths and 7 invalids. The ratio per 1,000 of strength contrasted with 1930, 1931 1932 and 1933 were :—

	1930.	1931.	1932.	1933.	1934.
Admissions . .	153·4	149·4	145·1	212·2	156·5
Deaths . .	0 13	0·10	0·10	0·06	0·05
Invalids. . .	0·06	0·08	0·07	0·05	0 06

Various problems relating to malaria and antimalarial measures are discussed in detail in the section referring to British troops.

The following table shows the incidence of the various types of the disease by Commands.

TABLE L.

Commands & Independent Districts.		Admissions and Deaths. Actuals.				Ratio per 1,000.			
		B. T.	M. T.	Qtn.	Clin.	B. T.	M. T.	Qtn.	Clin.
Northern	A.	8,000	1,604	13	1,172	141·3	28·3	0·2	20·7
	D.	..	3	..	2	..	0·05	..	0·04
Western .	A.	1,652	907	1	69	129·0	148·9	0·1	5·4
	D.	..	..	..	..	..	..	..	..
Eastern .	A.	1,545	676	10	341	65·5	93·7	0·4	14·5
	D.	..	1	..	..	..	0·04	..	..
Southern.	A.	1,095	546	16	66	51·7	73·0	0·8	3·1
	D.	..	..	..	..	..	..	..	..
Burma .	A.	198	102	1	41	64·0	33·0	0·3	13·3
	D.	..	..	..	..	..	..	..	..
All India	A.	12,490	3,835	41	1,689	106·5	32·7	0·3	14·4
	D.	..	4	..	2	..	0·03	..	0·02

The stations with an average annual strength for over 1,000 showing the highest incidence were :—

Wana	492·4	Bakloh	151·8
Fort Sandeman	465·4	Quetta	144·7
Peshawar	279·3	Jhansi	143·1
Jhelum	238·1	Kohat	142·8
Rawalpindi	194·3	Karachi	141·0
Nowshera	192·0	Razmak	139·9
Dehra Dun	187·7	Jul'undur	117·9
Maymyo	174·9	Ferozepore	112·4
Landikotal	171·7	Delhi	108·6
		Chaman	107·7
Bannu	171·5		
Abbottabad	169·7		
Lansdowne	168·1		

The stations with an average annual strength of over 500 and under 1,000 showing the highest incidence were :—

Neemuch	502·6	Nasirabad	241·2
Malakand	383·2	Mir Ali	238·3
Mardan	367·8	Baroda	223·1
Chittagong	285·6	Muttra	206·0
Shagai	285·5	Dharamsala	181·7
Thal	244·3		

As usual, the various stations draw attention to the adverse effects of leave and furlough, when men return to cantonments bringing with them infections contracted in their villages. This factor does not operate in the case of the British troops.

Pneumonia.

33. TABLE M.

Years.	Admissions. Actuals.	Admissions. Ratio per 1,000.	Deaths. Actuals.	Deaths. Ratio per 1,000.	Years.	Admissions. Actuals.	Admissions. Ratio per 1,000.	Deaths. Actuals.	Deaths. Ratio per 1,000.
1920	3,772	17·4	833	3·85	1926	1,508	11·2	230	1·70
1921	2,796	15·9	644	3·67	1927	1,367	10·3	190	1·43
1922	2,077	14·0	412	2·79	1928	1,097	8·4	147	1·12
1923	1,972	13·8	343	2·39	1929	1,167	9·1	181	1·40
1924	2,066	15·3	381	2·83	1930	1,147	9·0	159	1·24
1925	1,722	12·6	267	1·96	1931	1,078	8·7	132	1·06
					1932	961	7·9	97	0·80
					1933	730	6·2	89	0·76
					1934	704	6·0	58	0·49

Of the 704 cases admitted 586 were lobar and 118 lobular in type. The case mortality of the two types were 8·02 and 9·32 per cent. respectively.

The incidence by Commands was :—

	Ratio per 1,000
Northern Command	7·4
Western ,,	4·0
Eastern ,,	5·6
Southern ,,	4·1
Burma District	4·5

Pyrexia of uncertain origin.

34. 14 cases were included under this head giving a ratio of 0·1 per 1,000 compared with 0·1 in 1933.

Sandfly Fever.

35. The admissions for this disease decreased from 1,227 to 970 giving a ratio per 1,000 of strength of 8·3 compared with 10·4 in 1933. The incidence fell chiefly in the troops in Lucknow District, Delhi Brigade Area and Zhob Independent Brigade Area with ratios per 1,000 of 0·9, 2·8 and 13·1 respectively.

Small-pox.

36. There were 23 admissions with two deaths giving a ratio of 0·2 and 0·02 per 1,000. 99·86 per cent. of the troops were protected by vaccination within 5 years.

Tuberculosis.

37. Pulmonary tuberculosis caused 212 admissions with 8 deaths and 192 invalids giving ratios per 1,000 of 1·8, 0·07 and 1·61, respectively.

There were 41 admissions for tuberculosis of other organs with 5 deaths and 31 invalids giving ratios per 1,000 of 0·3, 0·04 and 0·26 respectively. Tuberculosis of various abdominal organs produced 10 admissions.

Venereal Diseases.

38. This group accounted for 1,130 admissions. The ratio per 1,000 fell from 10·8 in 1933 to 9·6 in 1934.

TABLE N.

Diseases.	Admissions.		Percentage.	
	1933.	1934.	Increase.	Decrease.
Gonorrhœa	557	491	..	11·85
Syphilis	455	409	..	10·11
Soft chancre	257	229	..	10·90

Other Diseases due to Infection or Infestation.

39. There were 5,752 admissions under this heading. The diseases mainly responsible were :—

Scabies	1,317	Filariasis	89
Influenza	1,234	Ascariasis	76
Mumps	953	Typhus fever	51
Common Cold	559	Cerebro-spinal fever	39
Ankylostomiasis	381	Kala azar	24
Dracontiasis	225	Diphtheria	10
Jaundice catarrhal	202	Relapsing fever	9
Measles	131	Leprosy	9
Chicken Pox	104	Septicæmia	6
Oriental sore	103		
Rheumatic fever	101		
Intestinal taeniasis	89		

Diseases of the Circulatory System.

40. Circulatory diseases caused 113 admissions to hospital, giving a ratio of 0·9 per 1,000, compared with 0·8 in 1933.

There were 14 deaths from this group of diseases giving a ratio per 1,000 of 0·12 compared with 0·12 in 1933.

The important diseases in this group were :—

Disordered action of the heart	45
Varix	20
Diseases of the heart valves	17
Inflammation of veins	7

Diseases of Respiratory System.

41. The admissions for diseases of the respiratory system totalled 2,132 exclusive of pneumonia and tuberculosis (916), a ratio of 18·2 per 1,000. Of these 1,680 were due to bronchitis giving ratio per 1,000 of 14·3 compared with 13·2 for 1933. There were 6 deaths and 28 cases were invalided.

The other important diseases in the group were pleurisy 208, laryngitis 111 and asthma 100.

Diseases of the Digestive System.

42. There were 6,022 admissions for the diseases of the digestive system with 26 deaths and 15 invalids, the ratios per 1,000 were admissions 50·6, deaths 0·22 and invalids 0·13.

The most important individual diseases were :—

TABLE O.

	Admissions.	Deaths.	Invalids.
Pharyngitis	2,529	..	..
Diarrhœa	742	..	..
Tonsillitis	637	..	1
Indigestion	440	..	..
Constipation	373	..	..
Hæmorrhoids	265	..	..
Appendicitis	182	6	2
Colic	138	..	..
Gastritis	119	1	..
Jaundice	111	2	..
Hepatitis	77	4	..

In addition to the above there were 64 cases of hernia with 5 invalids.

Minor Septic Diseases.

43. This group produced 4,060 admissions giving a ratio of 34·6 per 1,000 of strength. Included in the group were :—

Cellulitis	2,680
Boils	666
Abscess	383
Inflammation of lymphatic glands and vessels	200

Local Injuries.

44. There were 5,832 admissions in this group. The ratio per 1,000 is 49·0 compared with 48·2 in 1933.

Followers.

45. The total admissions 7,692 or 287·6 per 1,000 of the strength compared with 332·9 in 1933.

The table below gives figures for certain endemic and infectious diseases amongst followers :—

TABLE P.

	Admissions.			Admissions.	
	Actuals.	Ratio per 1,000.		Actuals.	Ratio per 1,000.
Malaria . .	2,740	102·5	Diarrhœa . .	127	4·7
Venereal diseases*	281	10·5	Sandfly fever .	117	4·4
Pneumonia .	276	10·3	Pulmonary tuberculosis.	52	1·9
Dysentery .	212	7·9	Enteric group of fevers.	35	1·3
Influenza . .	152	5·7			
Scabies . .	143	5·3	Dengue . .	16	0·6
			Small-pox . .	5	0·2

There were 120 deaths with a ratio of 4·49 per 1,000 of strength.

The principal causes were :—

TABLE Q.

	Actuals.	Ratio per 1,000.		Actuals.	Ratio per 1,000.
Pneumonia . . .	49	1·83	Other infectious diseases	10	0·37
Other respiratory diseases	12	0·45	Injuries . . .	7	0·26
Circulatory diseases .	11	0·41	Digestive diseases . .	5	0·19
			Pulmonary tuberculosis	5	0·19

Recruiting.

46. The total number of recruits examined at Recruiting centres in the year ending 31st March 1935 was 21,103, of these, 7,502 were rejected, giving a percentage of 35·55.

The corresponding figure for the year 1933-34 was 35·41 per cent.

*Gonorrhœa 122, Syphilis 93 and Soft chancre 66 .

The principal causes of rejection of recruits for the year ending 31st March 1935 were as follows :—

Disability.	No. of men rejected as unfit for enrolment out of 21,103 presented at recruiting centres only.		No. of recruits found unfit during training out of 16,639 enrolled (13,959 recruits enrolled at recruiting centres and 2,680 at unit headquarters).	
	Actuals.	Percentage.	Actuals.	Percentage.
Malaria (enlarged spleen)	871	4·13	4	0·02
Tuberculosis (Pulmonary)	69	0·33	4	0·02
Tuberculosis (Other organs)	6	0·03	3	0·02
Venereal diseases	149	0·71	..	..
Other diseases due to infection	19	0·09	11	0·07
Diseases of the nervous system	36	0·17	13	0·08
Defective vision	284	1·35	8	0·05
Trachoma	575	2·72	1	0·01
Other eye affections	226	1·07	6	0·04
Otitis media	300	1·42	5	0·03
Defective hearing	6	0·03	..	..
Other ear diseases	125	0·59	..	..
Diseases of nose and throat	213	1·01	..	..
Valvular disease of heart	187	0·89	5	0·03
Disordered action of heart	804	3·81	8	0·05
Varicose veins	163	0·77	..	..
Hæmorrhoids	150	0·71	..	..
Varicocele	133	0·63	1	0·01
Other diseases of circulatory system	25	0·12	..	..
Anæmia	165	0·78	2	0·01
Goitre	318	1·51	1	0·01
Respiratory disease excluding tuberculosis	13	0·06	1	0·01
Pyorrhœa	240	1·14	1	0·01
Loss or decay of teeth	28	0·13	..	..
Hernia	218	1·03	2	0·01
Other diseases of digestive system	21	0·10	..	0·01
Ankylosis of joint	37	0·18	..	..
Flat foot	137	0·65	2	0·01
Knock knee	85	0·40	1	0·01
Curvature of spine	198	0·94	1	0·01
Other deformities	306	1·45	3	0·02
Skin diseases	230	1·09	..	..
Poor physique	172	0·82	1	0·01
Other causes	993	4·71	32	0·19
Total	**7,502**	**35·55**	**116**	**0·70**

The reader who has perused the preceding section relating to British troops will have recognised that much of the subject matter in the latter is equally applicable to the Indian troops.

APPENDICES.

SECTION I.

BRITISH TROOPS, 1934.

TABLE A.

STATIONS BY COMMANDS AND INDEPENDENT DISTRICTS.

Stations.	Height above M.S. level in feet.	Authority for height.	Points of reference.
Northern Command.			
Abbottabad	4,010	S.D.	Map.
Ambala	902	,,	S.B.M.
Amritsar	754	,,	,,
Bannu	1,250	,,	Map.
Barian Camp and Khyragali	7,133 / 7,678	I.B. / S.D.	.. / Map.
Campbellpore	1,180	,,	,,
Cherat	4,546	,,	,,
Dagshai	6,087	,,	,,
Dalhousie Convalescent Depot	7,687	,,	,,
Dera Ismail Khan	568	,,	S.B.M.
Ferozepore	649	,,	,,
Gharial	6,811	S.G.	,,
Jhelum	762	S.D.	,,
Jullundur Cantt.	771	,,	B.M.
Jutogh	6,370	,,	Map.
Kalabagh & Baragali	7,963	,,	,,
Kalabagh & Mari Indus	682	,,	,,
Kasauli Convalescent Depot	6,050	,,	..
Kohat	1,725	,,	Map.
Khanspur and Ghora Dhaka	7,721	,,	,,
Kuldana	7,049	S.G	,,
Lahore Cantt. and Fort	706	S.D.	S.B.M.
Landikotal	3,509	,,	Map.
Manzai	1,650	,,	,,
Mir Ali	2,240	S.G.	V.G.L.
Multan	404	S.D.	S.B.M.
Murree Convalescent Depot	7,073	,,	Map.
Nowshera (Rly. Station)	966	,,	B.M.
Peshawar	1,152	,,	S.B.M.
Rawalpindi	1,689	,,	,,
Razmak	6,556	,,	Map.
Risalpur	1,014	,,	B.M.
Sialkot	829	,,	,,
Solon	5,078	,,	,,
Sargodha	615	S.D.	,,
Sabathu	4,000	,,	Map.
Thali	2,450	,,	,,
Upper Topa	7,000	M.O.	,,
Wana	4,530	S. G.	V. G. L.
Western Command.			
Fort Sandeman	4,600	S.D.	Map.
Hyderabad	95	,,	S.B.M.
Karachi (Holy Trinity Church)	28	,,	,,
Loralai	4,699	,,	Map.
Quetta	5,510	,,	S.B.M.
Eastern Command.			
Agra (Fort)	525	S.D.	S.B.M.
Allahabad & Fort	314	,,	,,
Bareilly	563	,,	,,
Barrackpore	24	,,	,,
Benares	256	,,	,,
Cawnpore	407	,,	B.M.
Chakrata	6,885	,,	Map.
Dacca	20	M.D.	..
Dehra Dun	2,232	S.D.	S.B.M.
Delhi	757	,,	,,
Dinapore	170	,,	Church.
Fatehgarh	467	,,	,,
Fort William	17	S.G.	..
Fyzabad	330	S.D.	S.B.M.
Jhansi	849	,,	,,
Landour Convalescent Depot	7,528	G.T.S.	..
Lansdowne	5,823	S.D.	Map.
Lebong	6,000	,,	..
Lucknow Kalubir's	383	,,	B.M.
Meerut	737	,,	S.B.M
Muttra	560	,,	,,
Naini Tal	6,400	,,	,,
Nowgong	735	,,	B. M.
Ranikhet and Chaubattia	5,980 / 6,942	,, / S.G.	.. / ..
Roorkee	879	S.D.	S.B.M.
Southern Command.			
Ahmedabad	162	S.D.	S.B.M.
Ahmednagar	2,180	,,	Map.
Bangalore	3,002	,,	S.B.M.
Baroda	114	,,	B. M.
Belgaum	2,523	,,	S.B.M.
Colaba (Bombay Town Hall)	20	,,	,,
Deolal	1,894	,,	,,
Jubbulpore	1,320	,,	,,
Kamptee (Rly. Station)	940	,,	B.M.
Madras (Obsy.)	250	G.T.	,,
Malapuram (Rly. Station)	1,380	,,	,,
Mhow	1,887	S.D.	,,
Mount Abu Sanatorium	3,836	,,	,,
Nasirabad	1,461	,,	Map.
Pachmarhi	3,490	,,	,,
Poona	1,867	,,	S.B.M.
Purandhar	4,560	,,	..
Saugor	1,755	,,	S.B.M.
Secunderabad	1,776	,,	,,
Wellington (Stn. Hospital)	5,800	,,	Map.
Burma Ind. District.			
Mandalay (Fort Dufferin)	246	S.D.	Map.
Maymyo	3,508	,,	,,
Mingaladon	118	,,	,,
Port Blair (Tindal Obsy.)	9		B.M.

S. D. = Survey Department.
S.B.M. = Standard Bench Mark.
B.M. = G. T. Bench Mark.
S.G. = Surveyor-General of India.
M.D. = Meteorological Department.
V.G.L. = Village ground level.

Map. = Heights taken from Topo. Maps.
M.O. = Medical Officer in charge of military hospital in their sanitary reports.
I.B. = Intelligence Branch of the Division of the Chief of the Staff.

TABLE I.

WARRANT OFFICERS, N. C. Os. AND MEN.

INDIA.

Table showing the average strength, admissions into hospital, deaths, numbers invalided and constantly sick, during the year 1934, with ratios per 1,000 of the strength.

Diseases. Average strength 54,429.	Admissions.	Deaths.	Invalids sent home.	Average number constantly sick.	Ratio per 1,000. Admissions.	Deaths.	Invalids sent home.	Constantly sick.
SPECIFIC DISEASES DUE TO INFECTION OR INFESTATION.								
Cholera	4	..	..	0·18	0·1	..	..	0·00
Dengue	360	..	..	9·33	6·6	..	..	0·17
Diphtheria	68	..	..	6·54	1·2	..	..	0·12
Dysentery — bacillary	513	..	5	22·65	9·4	..	0·09	0·42
Dysentery — exudate	383	..	..	15·90	7·0	..	..	0·29
Dysentery — amœbic	163	..	5	12·98	3·0	..	0·09	0·24
Dysentery — clinical	330	..	..	13·90	6·1	..	..	0·26
Enteric fevers (inclusive of typhoid, para A, B and C and enteric group.)	91	7	..	15·10	1·7	0·13	..	0·28
Erysipelas	9	1	..	0·50	0·2	0·02	..	0·01
Influenza	897	..	1	21·20	16·5	..	0·02	0·39
Malaria	3,676	2	2	120·26	67·5	0·04	0·04	2·21
Measles	6	..	..	0·31	0·1	..	..	0·01
Meningococcal infection (Cerebro-spinal fever)	2	1	..	0·17	0·0	0·02	..	0·00

TABLE I *contd.*

Diseases.	Admissions.	Deaths.	Invalids sent home.	Average number constantly sick.	Ratio per 1,000. Admissions.	Deaths.	Invalids sent home.	Constantly sick.
Average strength 54,429.								
SPECIFIC DISEASES DUE TO INFECTION OR INFESTATION—*contd.*								
Mumps	18	..	..	0·85	0·3	..	..	0·02
Plague	..	..	..	..	..	..	..	..
Pneumonia	212	11	4	19·68	3·9	0·20	0·07	0·36
Pyrexia of uncertain origin	46	..	..	3·01	0·8	..	..	0·06
Rheumatic fever	84	..	9	9 63	1·5	..	0·17	0·18
Sandfly fever	1,973	..	..	38·93	36·2	..	..	0·72
Scarlet fever	4	..	..	0·36	0·1	..	..	0·01
Small-pox	6	..	..	0·29	0·1	..	..	0·01
Scabies	76	..	..	3·04	1·4	..	..	0·06
Tuberculosis — Pulmonary	56	1	51	17·49	1·0	0·02	0·94	0·32
Tuberculosis — Other	8	1	10	2·40	0·1	0·02	0·18	0·04
Venereal diseases — Gonorrhœa	1,370	..	1	167·31	25·2	..	0·02	3·07
Venereal diseases — Soft chancre	221	..	..	23·63	4·1	..	..	0·43
Venereal diseases — Syphilis	244	..	3	21·96	4·5	..	0·06	0·40
Venereal diseases — Other V. D.	22	..	1	1·67	0·4	..	0·02	0·03
Typhus fever	52	3	1	4·20	1·0	0·06	0·02	0·08
Other diseases due to infection or infestation.	791	6	8	36·85	14·5	0·11	0·15	0·68
OTHER DISEASES CLASSIFIED UNDER SYSTEMS.								
Diseases of the nervous system	402	2	47	19·92	7·4	0·04	0·86	0·37
Mental diseases	152	..	67	22·26	2·8	..	1·23	0·41
Diseases of the eye	206	..	20	9·85	3·8	..	0·37	0·18
Diseases of the ear and nose	1,104	2	17	38·95	20·3	0·04	0·31	0·72

Diseases of the Circulatory system.	Valvular diseases of the heart.	17	..	13	1·31	0·3	..	0·24	0·02
	Disordered action of the heart	172	5	19	12·67	3·2	0·09	0·35	0·23
	Other diseases	79	4	10	5·09	1·5	0·07	0·18	0·09
Diseases associated with abnormalities of the blood		34	2	1	2·54	0·6	0·04	0·02	0·05
Diseases of the spleen		1	1	..	0·07	0·0	0·02	..	0·00
Diseases of the lymphatic system		228	..	1	15·32	4·2	..	0·02	0·28
Diseases of Ductless or endocrine glands		13	..	6	1·38	0•2	..	0·11	0·03
Diseases of the breast		21	..	..	0·74	0·4	..	..	0·01
Diseases of the Respiratory system.	Larynx and trachea	54	..	..	1·35	1·0	..	..	0·02
	Bronchi and bronchioles	808	1	13	30·95	14·8	0·02	0·24	0·57
	Lung, other than tuberculosis and pneumonia	18	..	5	1·60	0·3	..	0·09	0·03
	Other diseases	93	..	6	8·16	1·7	..	0·11	0·15
Diseases of the teeth and gums		118	..	..	2·49	2·2	..	..	0·05
Diseases of the Digestive system.	Inflammation of tonsils	1,696	..	..	41·81	31·2	..	..	0·77
	Liver diseases	96	2	3	7·33	1·8	0·04	0·06	0·13
	Other diseases	3,790	12	33	146·69	69·6	0·22	0·61	2·70
Diseases due to disorders of nutrition or of metabolism		14	..	5	1·73	0·3	..	0·09	0·03
Diseases of the generative system		616	..	3	28·43	11·3	..	0·06	0·52
Diseases of Bones, Joints, Muscles, Fasciæ and Bursæ		1,330	1	58	70·06	24·4	0·02	1·07	1·29
Diseases of the areolar tissue		2,835	2	..	95·61	52·1	0·04	..	1·76
Diseases of the skin		1,510	..	17	70·44	27·7	..	0·31	1·29
Diseases of the urinary organs		335	6	16	25·77	6·2	0·11	0·29	0·47
Injuries	General	138	17	2	4·24	2·5	0·31	0·04	0·08
	Local	3,391	26	35	140·71	62·3	0·48	0·64	2·59
	In action	..	..	..	..	..	..	..	..
Tumours and cysts		109	3	12	6·46	2·0	0·06	0·22	0·12
Malformations		5	..	..	0·54	0·1	..	..	0·01
Poisons		5	2	..	0·17	0·1	0·04	..	0·00
Parasites		..	..	..	..	..	..	..	..
No appreciable disease		171	..	1	6·14	3·1	..	0·02	0·11
*Suicides		(10)	(13)	..	(1·10)	(0·2)	(0·24)	..	(0·02)
	Total	31,246	121	511	1,411·13	574·1	2·22	9·39	25·93

* The figures against "Suicides" having already been shown under the heading of the injury, etc., which caused death, are not included in the total.

TABLE II.

WARRANT OFFICERS, N. C. Os. AND MEN—*contd.*

NORTHERN COMMAND.

Table showing the average strength, admissions into hospital, deaths and constantly sick during the year 1934 with ratios per 1,000 of the strength.

Diseases.	Admissions.	Deaths.	Average number constantly sick.	Ratio per 1,000. Admissions.	Deaths.	Constantly sick.
Average strength 17,423.						
SPECIFIC DISEASES DUE TO INFECTION OR INFESTATION.						
Cholera	..	..	..	..	..	..
Dengue	6	..	0·19	0·3	..	0·01
Diphtheria	17	..	1·13	1·0	..	0·06
Dysentery bacillary	97	..	4·86	5·6	..	0·28
Dysentery exudate	69	..	2·87	4·0	..	0·16
Dysentery amœbic	38	..	3·14	2·2	..	0·18
Dysentery clinical	149	..	6·51	8·6	..	0·37
Enteric fever (inclusive of typhoid, para A, B and enteric group)	31	3	5·42	1·8	0·17	0·31
Erysipelas	2	..	0·09	0·1	..	0·01
Influenza	249	..	5·62	14·3	..	0·32
Malaria	1,321	..	44·38	75·8	..	2·55
Measles	..	..	..	..	..	..
Meningococcal infection (cerebro-spinal fever)	1	1	0·01	0·1	0·06	0·00
Mumps	6	..	0·36	0·3	..	0·02
Plague	..	..	..	..	..	..
Pneumonia	102	4	9·10	5·9	0·23	0·52

Pyrexia of uncertain origin	22	..	1·62	1·3	..	0·09
Rheumatic fever	33	..	4·33	1·9	..	0·25
Sandfly fever	1,390	..	27·09	79·8	..	1·55
Scarlet fever	3	..	0·28	0·2	..	0·02
Small-pox	..	..	..	..	..	..
Scabies	27	..	0·91	1·5	..	0·05
Tuberculosis — Pulmonary	23	..	8·04	1·3	..	0·46
Tuberculosis — Other	2	..	0·97	0·1	..	0·06
Venereal diseases — Gonorrhœa	340	..	46·59	19·5	..	2·67
Venereal diseases — Soft chancre	45	..	5·31	2·6	..	0·30
Venereal diseases — Syphilis	41	..	3·85	2·4	..	0·22
Venereal diseases — Other V. D.	9	..	0·68	0·5	..	0·04
Typhus fever	13	..	1·02	0·7	..	0·06
Other diseases due to infection or infestation	351	3	16·09	20·1	0·17	0·92
OTHER DISEASES CLASSIFIED UNDER SYSTEMS.						
Diseases of the nervous system	107	1	4·48	6·1	0·06	0·26
Mental diseases	35	..	5·87	2·0	..	0·34
Diseases of the eye	86	..	3·69	4·9	..	0·21
Diseases of the ear and nose	351	..	15·35	20·1	..	0·88
Diseases of the Circulatory system. — Valvular diseases of the heart	6	..	0·80	0·3	..	0·05
Diseases of the Circulatory system. — Disordered action of the heart	59	1	6·08	3·4	0·06	0·35
Diseases of the Circulatory system. — Other diseases	18	2	1·01	1·0	0·11	0·06
Diseases associated with abnormalities of the blood	9	..	0·61	0·5	..	0·04
Diseases of the spleen	..	..	..	..	..	..
Diseases of the lymphatic system	53	..	2·63	3·0	..	0·15
Diseases of Ductless or endocrine glands	8	..	1·08	0·5	..	0·06
Diseases of the breast	9	..	0·43	0·5	..	0·02
Diseases of the Respiratory system. — Larynx and trachea	9	..	0·25	0·5	..	0·01
Diseases of the Respiratory system. — Bronchi and bronchioles	247	..	9·41	14·2	..	0·54
Diseases of the Respiratory system. — Lung, other than tuberculosis and pneumonia	7	..	0·94	0·4	..	0·05
Diseases of the Respiratory system. — Other diseases	29	..	2·43	1·7	..	0·14
Diseases of the teeth and gums	35	..	0·70	2·0	..	0·04

TABLE II—*contd.*

Diseases.	Admissions.	Deaths.	Average number constantly sick.	Ratio per 1,000. Admissions.	Deaths.	Constantly sick.
Average strength 17,423.						
Diseases of the Digestive system. — Inflammation of tonsils	563	..	13·93	32·3	..	0·80
Diseases of the Digestive system. — Liver diseases	27	..	2·10	1·5	..	0·12
Diseases of the Digestive system. — Other diseases	1,195	3	42·17	68·6	0·17	2·42
Diseases due to disorders of nutrition or of metabolism	4	..	0·27	0·2	..	0·02
Diseases of the generative system	173	..	7·12	9·9	..	0·41
Diseases of Bones, Joints, Muscles, Fasciæ and Bursæ	497	1	22·48	28·5	0·06	1·29
Diseases of the areolar tissue	995	1	31·90	57·1	0·06	1·83
Diseases of the skin	472	..	20·72	27·1	..	1·19
Diseases of the urinary organs	117	2	9·28	6·7	0·11	0·53
Injuries — General	52	6	1·50	3·0	0·34	0·09
Injuries — Local	1,207	9	47·55	69·3	0·52	2·73
Injuries — In action	..	..	..	..	..	..
Tumours and cysts	30	..	1·52	1·7	..	0·09
Malformations	2	..	0·31	0·1	..	0·02
Poisons	3	1	0·07	0·2	0·06	0·00
Parasites	..	..	..	..	..	..
No appreciable disease	61	..	2·81	3·5	..	0·16
*Suicides	(3)	(1)	(0·37)	(0·2)	(0·06)	(0·02)
Total	**10,853**	**38**	**459·95**	**622·9**	**2·18**	**26·40**

* The figures against "Suicides" having already been shown under the heading of the injury, etc., which caused death, are not included in the total.

TABLE III.

WARRANT OFFICERS, N. C. Os. AND MEN—*contd.*

WESTERN COMMAND.

Table showing the Average Strength, Admissions into Hospital, Deaths and Constantly Sick, during the year 1934, with Ratios per 1,000 of the Strength.

Diseases. Average strength 4,040.	Admissions.	Deaths.	Average number constantly sick.	Ratio per 1,000. Admissions.	Deaths.	Constantly sick.
SPECIFIC DISEASES DUE TO INFECTION OR INFESTATION.						
Cholera	..	..	..	..	..	..
Dengue	13	..	0·36	3·2	..	0·09
Diphtheria	1	..	0·25	0·2	..	0·06
Dysentery (bacillary)	86	..	3·60	21·3	..	0·89
Dysentery (exudate)	49	..	1·84	12·1	..	0·46
Dysentery (amœbic)	1	..	0·06	0·2	..	0·01
Dysentery (clinical)	53	..	1·88	13·1	..	0·47
Enteric fever (inclusive of typhoid, para. A, B and enteric group)	6	..	1·37	1·5	..	0·34
Erysipelas	..	..	0·02	..	..	0·00
Influenza	137	..	3·49	33·9	..	0·86
Malaria	648	..	17·11	160·4	..	4·24
Measles	..	..	..	..	..	..
Meningococcal infection (cerebro-spinal fever)	..	..	..	..	..	..
Mumps	..	..	..	..	..	..
Plague	..	..	..	..	..	..
Pneumonia	14	..	1·92	3·5	..	0·48

TABLE III—*contd.*

Diseases. Average Strength 4,040.	Admissions.	Deaths.	Average number constantly sick.	Ratio per 1,000. Admissions.	Deaths.	Constantly sick.
SPECIFIC DISEASES DUE TO INFECTION OR INFESTATION—*contd.*						
Pyrexia of uncertain origin	..	..	..	..	..	..
Rheumatic fever	13	..	0·90	3·2	..	0·22
Sandfly fever	32	..	0·83	7·9	..	0·21
Scarlet fever	..	..	..	..	..	..
Small-pox	..	..	..	..	..	..
Scabies	1	..	0·02	0·2	..	0·00
Tuberculosis — Pulmonary	5	..	0·82	1·2	..	0·20
Tuberculosis — Other	..	..	0·02	..	..	0·00
Venereal diseases — Gonorrhœa	75	..	8·54	18·6	..	2·11
Venereal diseases — Soft chancre	15	..	0·61	3·7	..	0·15
Venereal diseases — Syphilis	8	..	0·81	2·0	..	0·20
Venereal diseases — Other V. D.	2	..	0·40	0·5	..	0·10
Typhus fever	1	..	0·13	0·2	..	0·03
Other diseases due to infection or infestation	30	..	1·54	7·4	..	0·38
OTHER DISEASES CLASSIFIED UNDER SYSTEMS.						
Diseases of the nervous system	33	..	2·65	8·2	..	0·66
Mental diseases	15	..	2·19	3·7	..	0·54
Diseases of the eye	7	..	0·83	1·7	..	0·21
Diseases of the ear and nose	67	..	2·83	16·6	..	0·70
Diseases of the circulatory system. — Valvular diseases of the heart	4	..	0·20	1·0	..	0·05
Diseases of the circulatory system. — Disordered action of the heart	38	2	2·03	9·4	0·50	0·50
Diseases of the circulatory system. — Other diseases	3	..	0·11	0·7	..	0·03
Diseases associated with abnormalities of the blood	1	..	0·22	0·2	..	0·05
Diseases of the spleen	..	..	..	..	..	..
Diseases of the lymphatic system	9	..	0·61	2·2	..	0·15
Diseases of Ductless or endocrine glands	..	..	0·01	..	..	0·00
Diseases of the breast	1	..	0·08	0·2	..	0·02

Diseases of the respiratory system.	Larynx and trachea	3	..	0·07	0·7	..	0·02
	Bronchi and bronchioles	36	..	1·55	8·9	..	0·38
	Lung, other than tuberculosis and pneumonia	..	..	..	..	..	..
	Other diseases	7	..	0·65	1·7	..	0·16
Diseases of the teeth and gums		8	..	0·13	2·0	..	0·03
Diseases of the Digestive system.	Inflammation of tonsils	138	..	3·61	34·2	..	0·89
	Liver diseases	7	..	1·06	1·7	..	0·26
	Other diseases	215	..	10·49	53·2	..	2·60
Diseases due to disorders of nutrition or of metabolism		1	..	0·12	0·2	..	0·03
Diseases of the generative system		57	..	2·64	14·1	..	0·65
Diseases of Bones, Joints, Muscles, Fasciæ and Bursæ		115	..	7·83	28·5	..	1·94
Diseases of the areolar tissue		202	..	6·94	50·0	..	1·72
Diseases of the skin		125	..	7·78	30·9	..	1·93
Diseases of the urinary organs		22	..	1·34	5·4	..	0·33
Injuries	General	8	..	0·38	2·0	..	0·09
	Local	211	3	8·43	52·2	0·74	2·09
	In action	..	..	..	..	..	..
Tumours and cysts		8	..	0·30	2·0	..	0·07
Malformations		..	..	..	..	..	..
Poisons		..	..	..	..	..	..
Parasites		..	..	..	..	..	..
No appreciable disease		3	..	0·12	0·7	..	0·03
*Suicides		(1)	(1)	(0·02)	(0·02)	(0·02)	(0·00)
	Total	**2,534**	**5**	**111·72**	**627·2**	**1·24**	**27·65**

* The figures against "Suicides" having already been shown under the heading of the injury, etc., which caused death, are not included in the total.

TABLE IV.

WARRANT OFFICERS, N. C. Os. AND MEN—*contd.*

EASTERN COMMAND.

Table showing the Average Strength, Admissions into Hospital, Deaths and Constantly Sick during the year 1934, with Ratios per 1,000 of the Strength.

Diseases. Average strength 15,956	Admissions.	Deaths.	Average number constantly sick.	Ratio per 1,000. Admissions.	Deaths.	Constantly sick.
SPECIFIC DISEASES DUE TO INFECTION OR INFESTATION.						
Cholera	4	..	0·18	0·3	..	0·01
Dengue	43	..	1·39	2·7	..	0·09
Diphtheria	25	..	2·10	1·6	..	0·13
Dysentery (bacillary)	138	..	5·86	8·6	..	0·37
Dysentery (exudate)	81	..	3·71	5·1	..	0·23
Dysentery (amoebic)	62	..	4·49	3·9	..	0·28
Dysentery (clinical)	78	..	3·28	4·9	..	0·21
Enteric fever (inclusive of typhoid, para. A, B and enteric group)	37	2	5·69	2·3	0·13	0·36
Erysipelas	4	..	0·25	0·3	..	0·02
Influenza	242	..	5·71	15·2	..	0·36
Malaria	767	1	26·97	48·1	0·06	1·69
Measles	4	..	0·19	0·3	..	0·01
Meningococcal infection (cerebro-spinal fever)	1	..	0·16	0·1	..	0·01
Mumps	6	..	0·23	0·4	..	0·01
Plague	..	..	..	..	..	..
Pneumonia	53	4	5·00	3·3	0·25	0·31

Pyrexia of uncertain origin	7	..	0·72	0·4	..	0·05
Rheumatic fever	20	..	1·97	1·3	..	0·12
Sandfly fever	360	..	7·10	22·6	..	0·44
Scarlet fever	1	..	0·08	0·1	..	0·01
Small-pox	4	..	0·18	0·3	..	0·01
Scabies	30	..	1·41	1·9	..	0·09
Tuberculosis — Pulmonary	14	..	4·30	0·9	..	0·27
Tuberculosis — Other	3	..	0·76	0·2	..	0·05
Venereal diseases — Gonorrhœa	469	..	48·79	29·4	..	3·06
Venereal diseases — Soft chancre	90	..	10·60	5·6	..	0·66
Venereal diseases — Syphilis	85	..	7·55	5·3	..	0·47
Venereal diseases — Other V. D.	2	..	0·07	0·1	..	0·00
Typhus fever	12	..	1·04	0·8	..	0·07
Other diseases due to infection or infestation	215	3	8·36	13·5	0·19	0·52
OTHER DISEAS ES CLASSIFIED UNDER SYSTEMS.						
Diseases of the nervous system	136	..	5·55	8·5	..	0·35
Mental diseases	70	..	5·06	4·4	..	0·32
Diseases of the eye	69	..	2·76	4·3	..	0·17
Diseases of the ear and nose	277	1	7·40	17·4	0·06	0·46
Diseases of the circulatory system — Valvular diseases of the heart	5	..	0·27	0·3	..	0·02
Diseases of the circulatory system — Disordered action of the heart	18	1	1·39	1·1	0·06	0·09
Diseases of the circulatory system — Other diseases	27	2	1·86	1·7	0·12	0·12
Diseases associated with abnormalities of the blood	4	..	0·63	0·3	..	0·04
Diseases of the spleen	..	..	..	..	..	..
Diseases of the lymphatic system	56	..	3·79	3·5	..	0·24
Diseases of Ductless or endocrine glands	3	..	0·15	0·2	..	0·01
Diseases of the breast	3	..	0·06	0·2	..	0·00
Diseasesof the respiratory system — Larynx and trachea	19	..	0·30	1·2	..	0·02
Diseasesof the respiratory system — Bronchi and bronchioles	249	1	8·64	15·6	0·06	0·54
Diseasesof the respiratory system — Lung, other than tuberculosis and pneumonia	5	..	0·16	0·3	..	0·01
Diseasesof the respiratory system — Other diseases.	30	..	2·88	1·9	..	0·18

TABLE IV—*contd.*

Diseases. Average strength 15,956.	Admissions.	Deaths.	Average number constantly sick.	Ratio per 1,000. Admissions.	Deaths.	Constantly sick.
OTHER DISEASES CLASSIFIED UNDER SYSTEMS—*contd.*						
Diseases of the teeth and gums	33	..	0·77	2·1	..	0·05
Diseases of the Digestive system. — Inflammation of tonsils	433	..	9·79	27·1	..	0·61
Diseases of the Digestive system. — Liver diseases	26	2	1·72	1·6	0·12	0·11
Diseases of the Digestive system. — Other diseases	1,188	5	41·31	74·5	0·31	2·59
Diseases due to disorders of nutrition or of metabolism	3	..	0·82	0·2	..	0·05
Diseases of the generative system	183	..	9·00	11·5	..	0·56
Diseases of Bones, Joints, Muscles, Fasciæ and Bursæ	370	..	19·48	23·2	..	1·22
Diseases of the areolar tissue	794	1	25·80	49·8	0·06	1·62
Diseases of the skin	421	..	17·68	26.4	..	1·11
Diseases of the urinary organs	96	3	6·68	6·0	0·19	0·42
Injuries — Genera	53	6	1·84	3·3	0·38	0·12
Injuries — Local	942	7	40·90	59·0	0·44	2·56
Injuries — In action	..	..	..	..	..	..
Tumours and cysts	25	2	1·64	1·6	0·12	0·09
Malformations	..	..	..	..	..	..
Poisons	3	1	0·14	0·2	0·06	0·01
Parasites	..	..	..	..	..	..
No appreciable disease	40	..	1·07	2·5	..	0·07
*Suicides	(5)	(7)	(0·71)	(0·3)	(0·44)	(0·04)
Total	8,438	42	(377·50	528·8	2·63	23·66

*The figures against "Suicides" having already been shown under the heading of the injury, etc., which caused death, are not included in the total.

TABLE V.

WARRANT OFFICERS, N. C. Os. AND MEN—*contd.*

SOUTHERN COMMAND.

Table showing the Average Strength, Admissions into Hospital, Deaths and Constantly Sick, during the year 1934, with Ratios per 1,000 of the Strength.

Diseases. Average strength 15,206.	Admissions.	Deaths.	Average number constantly sick.	Ratio per 1,000. Admissions.	Deaths.	Constantly sick.
SPECIFIC DISEASES DUE TO INFECTION OR INFESTATION.						
Cholera	..	..	..	..	..	..
Dengue	203	..	5·15	13·3	..	0·34
Diphtheria	24	..	2·99	1·6	..	0·20
Dysentery bacillary	183	..	7·67	12·0	..	0·50
Dysentery exudate	171	..	6·99	11·2	..	0·46
Dysentery amœbic	54	..	4·74	3·6	..	0·31
Dysentery clinical	47	..	2·14	3·1	..	0·14
Enteric fever (inclusive of Typhoid, Para. A, B and enteric group).	16	2	2·48	1·1	0·13	0·16
Erysipelas	3	1	0·14	0·2	0·07	0·01
Influenza	260	..	6·17	17·1	..	0·41
Malaria	841	1	27·27	55·3	0·07	1·79
Measles	1	..	0·08	0·1	..	0·01
Meningococcal infection (cerebro-spinal fever)	..	..	..	..	..	..
Mumps	6	..	0·26	0·4	..	0·02
Plague	..	..	..	..	..	..
Pneumonia	39	3	3·37	2·6	0·20	0·22

TABLE V—*contd.*

Diseases.	Admissions.	Deaths.	Average number constantly sick.	Ratio per 1,000. Admissions.	Deaths.	Constantly sick.
Average strength—15,206.						
SPECIFIC DISEASES DUE TO INFECTION OR INFESTATION—*contd.*						
Pyrexia of uncertain origin	17	..	0·67	1·1	..	0·04
Rheumatic fever	16	..	2·27	1·1	..	0·15
Sandfly fever	190	..	3·88	12·5	..	0·26
Scarlet fever	..	..	..	..	..	..
Small-pox	2	..	0·11	0·1	..	0·01
Scabies	18	..	0·70	1·2	..	0·05
Tuberculosis—Pulmonary	15	1	4·50	1·0	0·07	0·30
Tuberculosis—Other	2	1	0·48	0·1	0·07	0·03
Venereal diseases—Gonorrhœa	413	..	54·72	27·2	..	3·60
Venereal diseases—Soft chancre	42	..	4·37	2·8	..	0·29
Venereal diseases—Syphilis	60	..	5·38	3·9	..	0·35
Venereal diseases—Other V. D.	9	..	0·52	0·6	..	0·03
Typhus fever	25	3	1·93	1·6	0·20	0·13
Other diseases due to infection or infestation	186	..	10·42	12·2	..	0·69
OTHER DISEASES CLASSIFIED UNDER SYSTEMS.						
Diseases of the nervous system	122	1	7·15	8·0	0·07	0·47
Mental diseases	31	..	9·08	2·0	..	0·60
Diseases of the eye	42	..	2·50	2·8	..	0·16
Diseases of the ear and nose	380	1	12·52	25·0	0·07	0·82
Diseases of the Circulatory system.—Valvular diseases of the heart	2	..	0·05	0·1	..	0·00
Diseases of the Circulatory system.—Disordered action of the heart	51	1	2·81	3·4	0·07	0·18
Diseases of the Circulatory system.—Other diseases	30	..	2·08	2·0	..	0·14
Diseases associated with abnormalities of the blood	15	..	0·80	1·0	..	0·05
Diseases of the spleen	1	1	0·07	0·1	0·07	0·00
Diseases of the lymphatic system	87	1	6·79	5·7	0·07	0·45
Diseases of Ductless or endocrine glands	2	..	0·14	0·1	..	0·01
Diseases of the breast	8	..	0·17	0·5	..	0·01

Diseases of the Respiratory system. — Larynx and trachea	15	..	0·45	1·0	..	0·03
Diseases of the Respiratory system. — Bronchi and bronchioles	254	..	9·89	16·7	..	0·65
Diseases of the Respiratory system. — Lung, other than tuberculosis and pneumonia.	5	..	0·35	0·3	..	0·03
Diseases of the Respiratory system. — Other diseases	23	..	1·94	1·5	..	0·13
Diseases of the teeth and gums	36	..	0·78	2·4	..	0·05
Diseases of the Digestive system. — Inflammation of tonsils	503	..	12·69	33·1	..	0·83
Diseases of the Digestive system. — Liver diseases	31	..	1·94	2·0	..	0·13
Diseases of the Digestive system. — Other diseases	1,118	4	49·44	73·5	0·26	3·25
Diseases due to disorders of nutrition or of metabolism	6	..	0·52	0·4	..	0·03
Diseases of the generative system	180	..	8·43	11·8	..	0·55
Diseases of Bones, Joints, Muscles, Fasciæ and Bursæ	305	..	17·85	20·1	..	1·17
Diseases of the areolar tissue	733	..	26·37	48·2	..	1·73
Diseases of the skin	446	..	21·09	29·3	..	1·39
Diseases of the urinary organs	95	1	8·24	6·2	0·07	0·54
Injuries — General	19	4	0·40	1·2	0·26	0·03
Injuries — Local	926	7	39·73	60·9	0·46	2·61
Injuries — In action	..	..	..	..	..	..
Tumours and cysts	40	1	2·76	2·6	0·07	0·18
Ma formations	3	..	0·23	0·2	..	0·02
Poilsons	1	..	0·02	0·1	..	0·00
Parasites	..	..	..	..	..	..
No appreciable disease	57	..	1·82	3·7	..	0·12
Suicides*	(1)	(4)	(0·00)	(0·1)	(0·26)	(0·00)
Total	**8,410**	**34**	**408·50**	**553·1**	**2·24**	**26·86**

*The figures against "Suicides" having already been shown under the heading of the injury, etc., which caused death, are not included in the total.

TABLE VI.

WARRANT OFFICERS, N. C. Os. AND MEN—*contd.*

BURMA DISTRICT.

Table showing the average strength, admissions into hospital, deaths and constantly sick, during the year 1934, with ratios per 1,000 of the strength.

Diseases.	Admissions.	Deaths.	Average number constantly sick.	Ratio per 1,000. Admissions.	Deaths.	Constantly sick.
Average strength—1,804.						
SPECIFIC DISEASES DUE TO INFECTION OR INFECTATION.						
Cholera	..	..	..	..	..	..
Dengue	95	..	2·24	52·7	..	1·24
Diphtheria	1	..	0·07	0·6	..	0·04
Dysentery bacillary	9	..	0·66	5·0	..	0·37
,, exudate	13	..	0·49	7·2	..	0·27
,, amœbic	8	..	0·55	4·4	..	0·30
,, clinical	3	..	0·09	1·7	..	0·05
Enteric fever (inclusive of typhoid, para. A, B and enteric group).	1	..	0·14	0·6	..	0·08
Erysipelas	..	..	..	..	..	..
Influenza	9	..	0·21	5·0	..	0·12
Malaria	99	..	4·53	54.9	..	2·51
Measles	1	..	0·04	0·6	..	0·02
Meningococcal infection (cerebro-spinal fever)	..	..	..	..	..	..
Mumps	..	..	..	..	..	..
Plague	..	..	..	..	..	..
Pneumonia	4	..	0·29	2·2	..	0·16

Pyrexia of uncertain origin	..	..	..	..	..	..
Rheumatic fever	2	..	0·19	1·1	..	0·11
Sandfly fever	1	..	0·03	0·6	..	0·02
Scarlet fever	..	..	..	..	..	..
Small-pox	..	..	..	..	..	..
Scabies	..	..	..	..	..	..
Tuberculosis — Pulmonary	..	..	..	..	..	..
Tuberculosis — Other	..	..	..	..	..	..
Venereal diseases — Gonorrhœa	73	..	8·67	40·5	..	4·81
Venereal diseases — Soft chancre	29	..	2·74	16·1	..	1·52
Venereal diseases — Syphilis	50	..	4·37	27·7	..	2·42
Venereal diseases — Other V. D.	..	..	..	..	..	..
Typhus fever	1	..	0·08	0·6	..	0·04
Other diseases due to infection or infestation	9	..	0·44	5·0	..	0·24
OTHER DISEASES CLASSIFIED UNDER SYSTEMS.						
Diseases of the nervous system	4	..	0·09	2·2	..	0·05
Mental diseases	1	..	0·06	0·6	..	0·03
Diseases of the eye	2	..	0·07	1·1	..	0·04
Diseases of the ear and nose	29	..	0·85	16·1	..	0·47
Diseases of the Circulatory system. — Valvular diseases of the heart	..	..	..	..	..	..
Diseases of the Circulatory system. — Disordered action of the heart	6	..	0·36	3·3	..	0·20
Diseases of the Circulatory system. — Other diseases	1	..	0·02	0·6	..	0·01
Diseases associated with abnormalities of the blood	4	1	0·27	2·2	0·55	0·15
Diseases of the spleen	..	..	..	..	..	..
Diseases of the lymphatic system	24	..	1·51	13·3	..	0·84
Diseases of Ductless or endocrine glands	..	..	..	..	..	..
Diseases of the breast	..	..	..	..	..	..
Diseases of the Respiratory system. — Larynx and trachea	8	..	0·28	4·4	..	0·16
Diseases of the Respiratory system. — Bronchi and bronchioles	22	..	1·46	12·2	..	0·81
Diseases of the Respiratory system. — Lung, other than tuberculosis and pneumonia.	1	..	0·15	0·6	..	0·08
Diseases of the Respiratory system. — Other diseases	4	..	0·26	2·2	..	0·14

TABLE VI—*contd.*

Diseases.	Admissions.	Deaths.	Average number constantly sick.	Ratio per 1,000. Admissions.	Deaths.	Constantly sick.
Average strength—1,804.						
OTHER DISEASES CLASSIFIED UNDER SYSTEMS—*contd.*						
Diseases of the teeth and gums	6	..	0·11	3·3	..	0·06
Diseases of the Digestive system. Inflammation of tonsils	59	..	1·79	32·7	..	0·99
Diseases of the Digestive system. Liver diseases	5	..	0·51	2·8	..	0·28
Diseases of the Digestive system. Other diseases	74	..	3·28	41·0	..	1·82
Diseases due to disorders of nutrition or of metabolism	..	..	..	..	..	..
Diseases of the generative system	23	..	1·24	12·7	..	0·69
Diseases of Bones, Joints, Muscles, Fasciæ and Bursæ	43	..	2·42	23·8	..	1·34
Diseases of the areolar tissue	108	..	4·53	59·9	..	2·51
Diseases of the skin	46	..	3·17	25·5	..	1·76
Diseases of the urinary organs	5	..	0·23	2·8	..	0·13
Injuries. General	6	1	0·12	3·3	0·55	0·07
Injuries. Local	105	..	4·10	58·2	..	2·27
Injuries. In action	..	..	..	..	..	..
Tumours and cysts	6	..	0·42	3·3	..	0·23
Malformations	..	..	..	..	..	..
Poisons	1	..	0·01	0·6	..	0·01
Parasites	..	..	..	..	..	..
No appreciable diseases	10	..	0·32	5·5	..	0·18
Suicides	..	..	..	..	..	..
Total	1,011	2	53·46	560·4	1·11	29·63

TABLE VII.

BRITISH OTHER RANKS.

Table showing monthly ratios per 1,000 of the strength of admissions for certain diseases for all India during the year 1934.

1934.	Enteric group of fevers.	Influenza.	Cholera.	Small-pox.	Malaria.	Dysentery protozoal.	Dysentery bacillary.	Dysentery bacillary exudate.	Dysentery group.	Pyrexia of uncertain origin.	Pneumonia (Lobar and Lobular).	Diarrhœa.	Dengue.	Sandfly fever.	Plague.	Effects of Heat.	All Causes.
January	0·04	1·5	..	0·02	2·3	0·1	0·4	0·3	0·4	0·1	0·3	0·8	0·6	0·2	..	0·02	38·9
February	0·1	1·8	..	...	1·7	0·1	0·4	0·2	0·1	0·1	0·4	0·4	0·3	0·3	..	..	34·5
March	0·1	3·2	..	...	1·7	0·2	0·5	0·2	0·3	0·02	0·3	1·2	0·8	0 9	..	0·02	42·1
April	0·1	1·5	0·04	0·02	1·9	0·3	0·9	0·9	0·8	0·1	0·4	2·3	0·4	3·8	..	0·04	47·2
May	0·3	1·7	..	0·04	3·2	0·3	0·7	0·6	0·5	0·2	0·4	1·3	1·1	5·9	..	0·1	53·5
June	0·3	0·9	0·02	..	4·1	0·2	0·9	0·5	0·4	0·1	0·3	1·1	0·7	7·0	..	0·8	52·6
July	0·3	0·8	..	..	7·9	0·4	1·3	1·4	0·8	0·1	0·3	1·8	0·7	7·5	..	0·4	59·0
August	0·1	0·9	0·02	..	10·3	0·4	1·4	1·4	1·0	0·04	0·2	2·0	0·5	4·0	..	..	59·3
September	0·1	0·9	..	..	13·9	0·3	0·8	0·5	0·6	0·02	0·2	1·1	0·4	3·7	..	0·02	55·5
October	0·1	0·8	..	..	11·4	0·4	0·6	0·7	0·5	0·02	0·1	0·9	1·0	1·7	..	0·02	53·2
November	0·2	0·8	..	..	6·5	0·2	0·5	0·5	0·4	0·1	0·4	0·8	0 5	0·8	..	..	42·6
December	0·04	1·5	..	0·02	2·4	0·1	0·5	0·3	0·1	0·04	0·4	0·9	...	0·2	..	...	33·0
Total	1·7	16·3	0·1	0·1	67·1	3·0	8·9	7·4	6·0	0·9	3·7	14·7	6·7	36·3	..	1·5	572·0

TABLE

BRITISH

Table showing ratios per 1,000 of strength of admissions for certain
India

Stations and Districts.	Average annual strength.	Enteric group of fevers.					Dysentery.			
		Typhoid fever.	Para. A.	Para. B.	Para. C.	Enteric group.	Bacillary Bact.	Bacillary exudate.	Protozoal.	Clinical.
Cherat	384	...	...	...	...	...	2·6	7·8	5·2	13·0
Landikotal	303	1·2	...	...	1·2	2·5	2·5	10·0	...	16·2
Nowshera	1,897	0·5	...	...	...	0·5	3·2	1·1	0·5	15·3
Peshawar	1,434	2·1	...	...	...	2·8	14·6	11·9	1·4	18·8
Peshawar District	4,520	1·1	...	...	0·2	1·5	6·6	6·6	1·1	16·4
Kohat	156	...	...	...	...	...	6·4	6·4	...	...
Thal	4	...	...	...	...	...	...	...	...	...
Fort Lockhart	5	...	...	...	...	...	...	...	...	...
Kohat District	165	...	...	...	...	...	6·1	6·1	...	...
Abbottabad	117	...	...	...	...	...	...	17·1	...	25·6
Barian	257	...	...	...	...	...	11·7	...	...	3·9
Campbellpore	182	...	...	...	...	...	5·5	5·5	...	5·5
Gharial	478	4·2	...	...	...	2·1	2·1	2·1	2·1	...
Jhelum	7	...	...	...	...	...	...	...	...	142·9
Kalabagh (Hazara)	92	...	...	...	...	...	...	...	...	...
Khanspur	218	...	...	...	...	...	...	...	...	...
Kuldana	400	...	...	...	...	2·5	2·5	2·5	...	...
Murree	147	...	6·8	...	...	...	13·6	6·8	6·8	6·8
Rawalpindi	2,429	0·8	0·4	...	...	...	3·7	6·2	4·9	7·8
Rawalpindi District	4,405	0·9	0·5	...	...	0·5	3·9	4·8	3·2	5·9
Ambala	702	...	...	...	...	...	4·3	...	..	15·7
Dagshai	386	...	...	...	...	7·8	5·2	5·2	...	5·2
Amritsar	153	...	...	...	...	...	6·5	26·1	6·5	13·1
Dalhousie	536	1·9	...	...	...	1·9	...	1·9	1·9	1·9
Ferozepore	260	...	1·2	...	...	...	...	...	...	2·3
Jullundur	603	...	...	...	...	...	1·7	3·3	...	3·3
Jutogh	183	...	...	...	...	5·5	...	5·5	...	...
Kasauli	256	...	...	...	...	3·9	3·9	...	7·8	...
Lahore	1,068	...	...	...	...	0·9	5·6	1·9	...	0·9
Multan	586	...	...	...	...	1·7	8·5	1·7	...	20·5
Subathu	197	...	...	...	...	5·1	...	...	...	...
Sialkot	1,279	...	...	...	...	...	3·1	1·6	11·7	10·9
Solon	137	...	...	...	...	...	7·3	14·6	...	29·2
Lahore District	6,947	0·1	0·1	...	...	1·3	3·5	2·4	2·7	7·3
Bannu	124	...	...	...	...	...	40·3	...	...	8·1
Dera Ismail Khan	60	...	...	...	...	...	...	...	...	...
Kalabagh and Mari Indus	12	...	...	...	...	...	...	...	...	...
Manzai	14	...	...	...	...	...	71·4	...	...	...
Razmak	1,063	...	...	...	...	...	11·3	...	...	0·9
Mir Ali	9	...	...	...	...	...	...	...	...	...
Wana	104	...	...	...	...	...	...	9·6	...	...

VIII.

OTHER RANKS.

diseases and constantly sick for all causes in each station and district in during 1934.

Diarrhœa.	Cholera.	Venereal diseases.	Small-pox.	Malaria	Dengue.	Sandfly fever.	Plague.	Influenza.	Pneumonia (Lobar and Lobular).	Heat-stroke.	Heat-exhaustion.	All Causes.	Constantly sick.
28·6	..	33·9	..	44·3	..	99·0	..	5·2	..	..	..	721·4	22·81
13·7	..	10·0	..	43·6	..	297·6	...	18·7	2·5	..	..	834·4	21·47
26·4	..	25·8	..	77·5	..	150·2	..	23·7	4·2	1·6	1·6	729·0	28·32
15·8	..	27·2	..	192·5	..	289·4	..	8·4	2·8	..	3·5	951·9	42·26
20·8	..	24·1	..	105·1	..	216·2	..	16·4	3·1	0·7	1·8	818·8	31·05
19·2	..	6·4	..	128·2	..	32·1	..	38·5	..	..	..	500·0	15·58
250·0	..	..	..	..	..	..	..	..	..	..	..	250·0	5·00
..	..	..	..	..	..	...	..	..	..	..	..	..	..
24·2	..	6·1	..	121·2	..	30·3	..	36·4	..	..	..	478·8	14·85
51·3	..	17·1	..	94·0	..	17·1	..	..	8·5	..	8·5	666·7	26·58
42·8	..	35·0	..	163·4	..	15·6	..	..	..	..	..	832·7	45·72
..	..	44·0	..	60·4	..	49·5	..	16·5	11·0	..	11·0	593·4	15·66
10·5	..	16·7	..	48·9	..	18·8	..	12·6	8·4	..	..	451·9	12·74
428·6	..	142·9	..	142·9	..	..	..	142·9	..	..	..	4,285·7	25·71
..	..	43·5	..	108·7	..	..	..	..	..	..	..	434·8	10·76
4·6	..	..	..	105·5	..	4·6	..	4·6	..	..	..	215·6	5·50
12·5	..	2·5	..	25·0	..	10·0	..	17·5	5·0	..	..	277·5	6·25
6·8	..	..	..	122·4	..	40·8	..	6·8	..	..	..	816·3	40·75
9·5	..	17·7	..	51·5	..	46·9	..	23·1	5·4	..	..	539·3	26·74
12·5	..	17·8	..	61·7	..	33·8	..	17·0	5·0	..	0·7	516·2	22·62
19·9	..	22·8	..	54·1	..	38·5	..	25·6	4·8	..	2·8	557·0	26·88
20·7	..	25·9	..	36·8	..	..	..	31·1	..	..	5·2	497·4	14·30
6·5	..	71·9	..	39·2	..	13·1	..	..	..	..	58·8	1,437·9	45·95
9·3	..	22·4	..	24·3	..	18·1	..	..	1·9	..	..	395·5	24·51
7·0	..	32·6	..	69·8	..	45·3	..	16·3	5·8	1·2	3·5	572·1	25·20
13·3	..	31·5	..	5·0	..	1·7	..	8·3	13·3	..	..	537·3	19·88
10·9	..	21·9	..	5·5	..	..	..	32·8	10·9	..	..	437·2	21·42
11·7	..	27·3	..	152·3	..	..	..	11·7	..	..	..	656·3	61·29
14·0	..	48·1	..	43·1	..	41·2	..	12·2	7·5	0·9	0·9	590·8	31·54
13·7	..	20·5	..	58·0	..	41·0	..	22·2	6·8	..	..	720·1	23·48
..	..	30·3	..	75·8	..	35·4	..	..	5·1	..	..	323·2	9·80
16·4	..	29·7	..	79·7	4·7	63·3	..	..	13·3	..	..	600·5	24·45
36·5	..	14·6	..	7·3	..	7·3	..	..	..	..	..	598·5	12·48
13·8	..	30·4	..	53·5	0·9	33·5	..	12·1	7·2	0·3	2·4	582·4	25·94
24·2	..	8·1	..	169·4	..	177·4	..	..	8·1	..	..	846·8	24·03
..	..	33·3	..	283·3	..	..	..	..	..	..	..	500·0	14·83
..	..	..	..	..	..	..	..	..	33·3	..	..	500·0	15·83
..	..	..	..	142·9	..	71·4	..	..	..	..	..	785·7	20·71
11·3	..	3·8	..	97·8	..	..	..	6·6	9·4	..	..	456·3	16·56
..	..	..	..	222·2	..	222·2	..	..	..	..	..	777·7	8·89
19·2	..	..	..	192·3	..	..	..	9·6	9·6	..	..	721·2	23·08

TABLE

Stations and Districts.	Average annual strength.	Enteric group of fevers.					Dysen			
		Typhoid fever.	Para. A.	Para. B.	Para. C.	Enteric group.	Bacillary Bact.	Bacillary exudate.	Protozoal.	Clinical.
Waziristan District . .	1,386	...	...	...	...	...	13·0	0·7	...	1·4
Quetta	2,491	0·8	..	...	...	1·2	26·5	21·3	0·4	14·9
Baluchistan District . .	2,491	0·8	..	...	...	1·2	26·5	21·3	0·4	14·9
Hyderabad . . .	378	...	...	...	...	...	7·9	...	...	7·9
Karachi	1,141	1·8	...	...	...	...	9·6	4·4	...	9·6
Sind Bde. Area . . .	1,519	1·3	...	...	...	...	9·2	3·3	...	9·2
Bareilly	785	...	...	...	...	2·8	17·8	2·5	...	3·8
Chakrata	753	2·7	...	...	...	2·7	1·3	1·3	...	21·2
Dehra Dun . . .	51	...	...	...	...	...	19·6	19·6	...	...
Jhansi	1,147	0·9	...	...	...	6·1	13·1	11·3	11·3	9·6
Landour	48	...	...	...	...	...	20·8	...	...	...
Meerut	1,925	...	...	...	...	0·5	10·9	10·4	4·7	4·2
Ranikhet	1,071	...	...	...	...	1·9	6·5	2·8	10·3	3·7
Roorkee	38	...	...	...	...	...	...	...	...	..
Meerut District . . .	5,825	0·5	...	...	...	2·4	10·3	6·9	5·7	7·2
Allahabad . . .	852	2·3	1·2	...	...	1·2	11·7	4·7	3·5	1·2
Benares	139	...	...	...	...	...	..	7·2	...	...
Cawnpore . . .	747	...	...	...	...	...	1·3	1·3	...	...
Fyzabad	723	1·4	...	...	...	2·8	..	1·4	2·8	5·5
Lucknow	2,340	...	...	...	...	0·4	12·0	0·9	0·4	1·7
Lucknow District . .	4,801	0·6	0·2	...	...	0·4	8·1	1·9	1·2	1·9
Calcutta	1,022	1·0	...	...	...	2·9	19·6	8·8	2·9	...
Barrackpore . . .	563	...	...	...	...	3·6	10·7	1·8	16·0	1·8
Dinapore	687	...	...	...	...	1·5	1·5	1·5	1·5	...
Lebong	361	...	...	...	...	...	...	...	19·4	...
Dacca	658	...	...	...	...	1·5	...	1·5	1·5	...
P. & A. District . .	3,291	0·8	...	...	...	2·1	8·2	3·6	6·4	0·3
Agra	814	...	...	...	...	1·2	..	1·2	...	20·9
Delhi	942	..	...	...	...	3·2	1·1	24·4	3·2	3·2
Muttra	282	3·5	...	...	...	3·5	7·1	...	7·1	10·6
Delhi Ind. Bde. . . .	2,039	0·5	...	...	...	2·5	1·5	11·8	2·5	11·3
Ahmednagar . . .	878	...	2·3	...	...	...	22·8	21·6	4·6	...
Jubbulpore . . .	1,389	...	...	...	...	0·7	12·2	18·7	10·8	...
Kamptee	771	...	...	...	...	...	...	6·5	...	13·0
Secunderabad . . .	2,742	0·7	...	...	...	0·7	18·6	21·9	2·2	7·7
Pachmarhi . . .	56	...	...	...	...	...	17·9	...	...	...
Saugor	22	...	...	...	...	...	...	...	...	...

VIII—*contd.*

Diarrhœa.	Cholera.	Venereal diseases.	Small-pox.	Malaria.	Dengue.	Sandfly fever.	Plague.	Influenza.	Pneumonia (Lobar and Lobular).	Heat-stroke.	Heat-exhaustion.	All Causes.	Constantly sick
12·3	..	5·1	..	119·8	..	18·0	..	5·8	9·4	..	..	518·8	17·63
7·2	..	23·3	..	171·8	..	..	...	52·2	2·8	..	..	685·3	28·13
7·2	..	23·3	..	171 8	..	..	..	52·2	2·8	..	..	685·	28·13
15·9	..	15·9	..	330·7	..	5·3	..	..	5·3	..	2·6	552·9	16·22
3·5	..	20·2	..	77·1	11·4	26·3	..	..	1·8	0·9	..	496·9	31·89
6·6	..	19·1	..	140·0	8·6	21·1	..	..	2·6	0·7	0·7	560·9	27·99
20·4	..	28·0	..	33·1	1·3	7·6	..	39·5	2·5	..	..	415·3	19·10
19·9	..	19·9	..	22·6	..	15·9	..	37·2	4·0	..	..	467·5	18·23
58·8	..	39·2	..	19·6	..	..	..	..	39·2	..	..	568·6	26·47
27·9	..	27·9	..	55·8	..	40·1	..	35·7	7·0	1·7	4·4	664·3	27·38
41·7	..	20·8	..	62·5	..	..	..	62·5	20·8	..	..	437·5	12·92
8·8	..	30·6	1·0	29·6	..	4·7	..	..	4·7	..	..	464·9	28·15
14·9	..	17·7	..	16·8	0·9	..	..	1·9	..	..	..	465·0	31·58
..	..	..	..	52·6	..	..	..	..	..	..	..	315·8	5·26
17·3	..	25·8	0·3	32·3	0·3	12·5	..	18·0	4·3	0·3	0·9	497·0	25·80
21·1	..	56·3	..	119·7	2·3	22·3	..	8·2	1·2	..	28·2	644·4	25·09
21·6	..	79·1	..	36·0	14·4	122·3	..	..	..	..	..	633·1	24·53
49·5	..	25·4	..	53·5	..	54·9	..	..	4·0	..	1·3	641·2	21·30
16·6	..	41·5	..	1·4	..	22·1	..	..	5·5	1·4	..	515·9	16·18
14·1	..	45·7	...	19·7	..	52·1	..	8·5	2·6	..	0·9	435·9	17·89
21·5	..	44·8	..	40·4	0·8	44·8	..	5·6	2·9	0·2	5·6	522·6	19·63
9·8	3·9	36·2	..	23·5	22·5	..	..	47·9	5·9	1·0	..	481·4	25·08
5·3	..	78·2	..	40·9	12·4	..	..	10·7	1·8	..	..	426·3	37·37
1·5	..	39·3	..	14·6	2·9	50·9	..	..	..	..	..	400·3	14·95
11·4	..	27·7	..	24·9	..	..	..	13·9	..	..	..	335·2	12·02
6·1	..	60·8	..	65·3	1·5	..	..	33·4	3·0	..	..	652·0	16·37
6·7	1·2	48·0	..	33·1	10·0	10·6	..	24·9	2·7	0·8	..	473·1	21·88
15·4	..	24·6	..	84·8	4·9	22·1	..	17·2	1·2	..	1·2	547·9	19·85
26·5	..	70·0	..	168·6	..	11·7	..	10·6	4·2	..	1·1	847·3	37·40
..	..	42·6	..	156·0	..	28·4	..	..	.	..	..	698·6	25·53
19·6	..	48·1	..	133·4	2·0	18·1	..	11·8	2·5	..	1·0	707·2	28·75
18·2	...	10·3	..	86·4	2·3	..	..	26·2	1·1	...	1·1	597·9	16·83
9·4	...	28·8	0·7	74·9	..	2·2	..	5·8	1·4	..	1·4	549·3	25·90
18·2	...	55·8	..	92·1	..	75·2	..	18·2	..	..	..	668·0	20·93
25·5	..	22·6	..	16·8	19·3	13·1	..	14·2	2·9	..	0·4	554·3	28·37
17·9	..	17·9	..	89·3	..	17·9	..	..	..	..	..	207·9	8·21
136·4	..	..	..	45·5	..	..	..	..	..	..	..	1000·0	19·09

TABLE

Stations and Districts.	Average annual strength.	Enteric group of fevers.					Dysentery.			
		Typhoid fever.	Para. A.	Para. B.	Para. C.	Enteric group.	Bacillary Bact.	Bacillary exudate.	Protozoal.	Clinical.
Deccan District . . .	5,858	0·3	0·3	...	...	0·5	15·2	18·8	4·3	5·3
Mhow	1,530	...	...	...	...	...	14·4	7·8	0·7	3·3
Mount Abu . . .	52	...	...	...	...	...	...	...	...	...
Nasirabad . . .	744	2·7	...	...	...	...	4·0	2·7	4·0	...
Ahmedabad . . .	136	...	...	...	...	7·4	...	7·4	7·4	...
Colaba	802	...	...	...	...	1·2	6·2	1·2	6·2	1·2
Deolali	407	...	...	...	...	...	2·5	7·4	4·9	12·3
Bombay District . .	3,671	0·5	...	...	...	0·5	8·4	5·2	3·3	3·0
Belgaum	74	...	...	...	...	...	...	13·5	...	...
Poona	2,416	...	0·4	...	...	...	14·5	10·8	2·9	0·4
Purandhar . . .	74	...	...	...	...	...	...	...	13·5	...
Poona Bde. Area . .	2,564	...	0·4	...	...	...	13·7	10·5	3·1	0·4
Bangalore . . .	1,319	...	...	...	...	..	10·6	12·9	2·3	...
Madras	793	...	...	...	...	...	2·5	5·0	2·5	...
Malapurum . . .	143	...	...	...	...	...	...	7·0	...	14·0
Wellington . . .	858	2·3	...	...	...	...	3·5	...	1·2	...
Madras District . .	3,113	0·6	...	...	...	...	6·1	7·1	1·9	0·6
Mandalay . . .	154	...	...	...	...	...	6·5	19·5	...	...
Maymyo	733	...	...	...	...	...	1·4	6·8	1·4	...
Mingaladon . . .	789	...	...	...	...	1·3	11·4	2·5	6·3	2·5
Port Blair . . .	128	...	...	...	...	...	...	15·6	7·8	...
Burma District . . .	1,804	...	...	...	...	0·6	6·1	6·7	3·9	1·1
INDIA .	54,429	0·5	0·1	...	0·0	1·0	8·9	7·4	3·0	6·0

VIII—*concld.*

Diarrhœa.	Cholera.	Venereal diseases.	Small-pox.	Malaria.	Dengue.	Sandfly fever.	Plague.	Influenza.	Pneumonia (Lobar and Lobular).	Heat-stroke.	Heat-exhaustion.	All Causes.	Constantly sick.
20·0	..	25·3	0·2	51·6	9·4	16·7	..	14·5	1·9	..	0·7	573·6	24·85
30·1	..	18·3	0·7	101·3	..	2·6	..	58·2	4·6	..	..	570·6	23·57
..	..	19·2	..	...	..	...	..	38·5	...	..	..	442·3	15·00
16·1	..	37·6	..	153·2	..	55·1	..	...	1·8	..	..	639·8	26·17
7·4	..	22·1	..	169·1	51·5	51·5	..	7·4	7·4	..	..	882·4	22·79
12·5	..	59·9	..	49·9	15·0	47·4	..	43·6	...	..	..	804·2	39·74
19·7	..	36·9	..	130·2	9·8	7·4	..	9·8	4·9	..	2·5	547·9	15·48
21·0	..	33·5	0·3	104·9	6·3	25·3	..	35·7	3·0	..	0·3	642·9	26·58
18·5	..	13·5	..	13·5	..	..	..	..	13·5	..	..	608·1	15·00
7·0	..	20·7	..	55·5	..	0·8	..	14·1	2·1	..	..	457·8	32·08
27·0	..	13·5	..	13·5	..	..	..	..	..	..	..	351·4	28·62
7·8	..	20·3	..	53·0	..	0·8	..	13·3	2·3	..	..	459·0	31·49
3·8	..	52·3	..	3·0	23·5	..	..	4·5	0·8	..	..	465·5	27·87
3·8	..	82·0	..	3·8	118·5	..	..	8·8	..	..	..	634·3	35·78
7·0	..	69·9	..	7·0	14·0	..	..	..	7·0	..	7·0	685·3	30·70
11·7	..	31·5	..	5·8	..	..	..	..	4·7	..	..	333·3	19·32
6·1	..	54·9	..	4·2	40·8	..	..	4·2	1·9	..	0·3	482·2	27·66
..	..	188·3	..	32·5	51·9	6·5	..	...	..	..	6·5	623·4	21·17
5·5	..	65·5	..	35·5	10·9	..	..	12·3	1·4	..	..	455·7	27·79
1·3	..	91·3	..	72·2	100·1	..	..	..	3·8	1·3	..	678·1	35·99
..	..	39·1	..	85·9	..	..	..	..	..	..	..	406·3	12·50
2·8	..	85·4	..	54·9	52·7	0·6	..	5·0	2·2	0·6	0·6	563·7	29·73
14·7	0·1	32·3	0·1	67·1	6·7	36·3	..	16·3	3·7	0·2	1·3	572·0	25·70

TABLE IX.

BRITISH OFFICERS (BRITISH SERVICE).

Table showing the Average strength, Admissions into hospital, Deaths and Constantly sick, during the year 1934, with Ratios per 1,000 of the strength.

Diseases.	Admissions.	Deaths.	Average number constantly sick.	Ratio per 1,000. Admissions.	Deaths.	Constantly sick.
Average strength . . . . . 2,344.						
Specific diseases due to infection or infestation.						
Cholera	..	..	..	..	..	..
Dengue	8	..	0·17	3·4	..	0·07
Diphtheria	6	..	0·78	2·6	..	0·33
Dysentery bacillary	28	..	0·95	11·9	..	0·41
,, exudate	20	..	0·85	8·5	..	0·36
,, amœbic	23	..	0·85	9·8	..	0·36
,, clinical	9	..	0·34	3·8	..	0·15
Enteric fever (inclusive of typhoid, para. A, B and enteric group).	10	2	1·07	4·3	0·85	0·46
Erysipelas	3	..	0·10	1·3	..	0·04
Influenza	56	..	1·12	23·9	..	0·48
Malaria	77	..	2·09	32·8	..	0·89
Measles	1	..	0·02	0·4	..	0·01
Meningococcal infection (cerebro-spinal fever)	..	..	..	..	..	..
Mumps	2	..	0·06	0·9	..	0·03
Plague	..	..	..	..	..	..
Pneumonia	9	..	0·62	3·8	..	0·26
Pyrexia of uncertain origin	5	..	0·43	2·1	..	0·18
Rheumatic fever	4	..	0·22	1·7	..	0·09
Sandfly fever	57	..	0·90	24·3	..	0·38
Scarlet fever	..	..	..	..	..	..
Small-pox	1	..	0·03	0·4	..	0·01
Scabies	..	..	..	..	..	..
Tuberculosis { Pulmonary	2	..	0·10	0·9	..	0·04
Tuberculosis { Other	..	..	..	..	..	..

Venereal diseases — Gonorrhœa	..	..	..	..	..	..
Venereal diseases — Soft chancre	..	..	..	..	..	..
Venereal diseases — Syphilis	..	..	..	..	..	..
Venereal diseases — Other V. D.	..	..	..	..	..	...
Typhus fever	1	...	0·06	0·4	..	0·03
Other diseases due to infection or infestation	56	..	2·19	23·9	..	0·93
Other diseases classified under systems.						
Diseases of the nervous system	10	1	0·43	4·3	0·43	0·18
Mental diseases	3	..	0·42	1·3	..	0·18
Diseases of the eye	6	..	0·21	2·6	..	0·09
Diseases of the ear and nose	34	..	0·93	14·5	..	0·40
Diseases of the circulatory system. — Valvular diseases of the heart	..	..	...	...	...	..
Diseases of the circulatory system. — Disordered action of the heart	2	..	0·09	0·9	..	0·04
Diseases of the circulatory system. — Other diseases	12	2	0·53	5·1	0·85	0·25
Diseases associated with abnormalities of the blood	...	..	..	..	..	..
Diseases of the spleen	..	..	..	..	..	..
Diseases of the lymphatic system	...	..	..	..	..	..
Diseases of Ductless or endocrine glands	..	..	..	..	..	..
Diseases of the breast	..	..	..	..	..	..
Diseases of the respiratory system. — Larynx and trachea	1	..	0·02	0·4	..	0·01
Diseases of the respiratory system. — Bronchi and bronchioles	13	..	0·15	5·5	..	0·06
Diseases of the respiratory system. — Lung, other than tuberculosis and pneumonia.	1	1	0·01	0·4	0·43	0·00
Diseases of the respiratory system. — Other diseases	2	..	0·08	0 9	..	0·03
Diseases of the teeth and gums	12	..	0·32	5·1	..	0·14
Diseases of the digestive system. — Inflammation of tonsils	52	...	1 17	22·2	..	0·50
Diseases of the digestive system. — Liver diseases	8	...	0·30	3·4	..	0·13
Diseases of the digestive system. — Other diseases	163	3	5·07	69·5	1·28	2·16
Diseases due to disorders of nutrition or of metabolism	..	..	...	...	..	...
Diseases of the generative system	..	..	0·11	1·7	..	0·50
Diseases of Bones, Joints, Muscles, Fasciæ and Bursæ	34	..	0·98	14·5	..	0·42
Diseases of the areolar tissue	98	..	2·80	41·8	..	1·19
Diseases of the skin	20	..	0·85	8·5	..	0·36
Diseases of the urinary organs	24	..	1·48	10·2	..	0·63
Injuries — General	5	..	0·19	2·1	..	0·08
Injuries — Local	119	7	4·73	50·8	2·99	2·02
Injuries — In action	..	..	...	...	..	...
Tumours and cysts	3	..	0·15	1·3	..	0·06
Malformations	..	..	..	..	..	..
Poisons	..	..	..	..	..	..
Parasites	..	..	...	...	..	...
No appreciable disease	2	..	0·02	0·9	..	0·01
*Suicides	...	(5)	...	...	(2·13)	...
Total	1,006	16	34·05	429·2	6·83	14·53

*The figures against "suicides" having already been shown under the heading of the injury, etc., which caused death, are not included in the total.

TABLE X.

WIVES OF WARRANT OFFICERS, N. C. Os. AND MEN.

INDIA.

Table showing the Average Strength, Admissions into Hospital, Deaths and Constantly Sick, during the year 1934, with Ratios per 1,000 of the Strength.

Average strength 4,480

Diseases.	Admissions.	Deaths.	Average number constantly sick.	Ratio per 1,000. Admissions.	Deaths.	Constantly sick.
Specific diseases due to infection or infestation.						
Cholera	...	...	...	...	...	...
Dengue	12	...	0·23	2·7	...	0·05
Diphtheria	3	...	0·21	0·7	...	0·05
Dysentery bacillary	28	...	0·86	6·3	...	0·19
,, exudate	15	...	0·52	3·3	...	0·12
,, amœbic	7	...	0·41	1·6	...	0·09
,, clinical	11	...	0·25	2·5	...	0·06
Enteric fever (inclusive of typhoid, para. A, B and enteric group).	5	...	0·79	1·1	...	0·18
Erysipelas	7	...	0·27	1·6	...	0·06
Influenza	17	...	0·48	3·8	...	0·11
Malaria	112	...	2·85	25·0	...	0·64
Measles	2	...	0·06	0·4	...	0·01
Meningococcal infection (cerebro-spinal fever)	...	...	...	...	...	...
Mumps	...	...	...	...	...	...
Plague	...	...	...	...	...	...
Pneumonia	5	1	0·27	1·1	0·22	0·06
Pyrexia of uncertain origin	...	...	...	...	...	...
Rheumatic fever	8	...	0·32	1·8	...	0·07
Sandfly fever	17	...	0·24	3·8	...	0·05
Scarlet fever	1	...	0·06	0·2	...	0·01
Small-pox	2	...	0·12	0·4	...	0·03
Scabies	1	...	0·03	0·2	...	0·01
Tuberculosis — Pulmonary	6	...	1·30	1·3	...	0·29
Tuberculosis — Other	1	...	0·15	0·2	...	0·03
Venereal disease — Gonorrhœa	1	...	0·27	0·2	...	0·06
Venereal disease — Soft chancre	...	...	...	...	...	...
Venereal disease — Syphilis	1	...	0·05	0·2	...	0·01
Venereal disease — Other V. D.	...	...	...	...	...	...

Typhus fever	...	...	...	...	...	...
Other diseases due to infection or infestation	26	1	0·84	5·8	0·22	0·19
Other diseases classified under systems.						
Diseases of the nervous system	21	..	0·82	4·7	...	0·18
Mental diseases	38	...	0·94	8·5	...	0·21
Diseases of the eye	5	...	0·10	1·1	...	0·02
Diseases of the ear and nose	36	1	1·02	8·0	0·22	0·23
Diseases of the Circulatory system. — Valvular diseases of the heart	4	...	0·16	0·9	...	0·04
Diseases of the Circulatory system. — Disordered action of the heart	8	...	0·25	1·8	...	0·06
Diseases of the Circulatory system. — Other diseases	17	1	1·04	3·8	0·22	0·23
Diseases associated with abnormalities of the blood	18	...	0·75	4·0	...	0·17
Diseases of the spleen	...	...	...	...	...	...
Diseases of the lymphatic system	7	...	0·20	1·6	...	0·04
Diseases of Ductless or endocrine glands	2	...	0·15	0·4	...	0·03
Diseases of the breast	15	...	0·60	3·3	...	0·13
Diseases of the Respiratory system. — Larynx and trachea	1	...	0·01	0·2	...	0·00
Diseases of the Respiratory system. — Bronchi and bronchioles	54	1	1·45	12·1	0·22	0·32
Diseases of the Respiratory system. — Lung, other than tuberculosis and pneumonia.	...	...	...	...	...	...
Diseases of the Respiratory system. — Other diseases	7	...	0·27	1·6	...	0·06
Diseases of the teeth and gums	13	...	0·18	2·9	...	0·04
Diseases of the Digestive System. — Inflammation of tonsils	55	...	1·02	12·3	...	0·23
Diseases of the Digestive System. — Liver diseases	9	...	0·42	2·0	...	0·09
Diseases of the Digestive System. — Other diseases	265	2	7·71	59·2	0·45	1·72
Diseases due to disorders of nutrition or of metabolism	6	...	0·21	1·3	...	0·05
Diseases of the generative system	330	2	12·15	73·7	0·45	2·71
Diseases of Bones, Joints, Muscles, Fasciae and Bursae	23	...	0·81	5·1	...	0·18
Diseases of the areolar tissue	34	...	0·86	7·6	...	0·19
Diseases of the skin	9	...	0·21	2·0	...	0·05
Diseases of the urinary organs	45	...	1·86	10·0	...	0·42
Injuries — General	1	1	0·04	0·2	0·22	0·01
Injuries — Local	31	...	1·33	6·9	...	0·30
Injuries — In action	...	...	...	...	...	...
Tumours and cysts	17	...	1·05	3·8	...	0·23
Malformations	1	...	0·05	0·2	...	0·01
Poisons	...	...	...	...	...	...
Parasites	...	...	...	...	...	...
No appreciable disease	36	...	0·99	8·0	...	0·22
Suicides	...	...	...	...	...	...
Total	1,396	10	47·23	311·6	2·23	10·64

TABLE XI.

CHILDREN OF WARRANT OFFICERS, N. C. Os. AND MEN.

INDIA.

Table showing the Average Strength, Admissions into Hospital, Deaths, and Constantly Sick, during the year 1934, with Ratios per 1,000 of the Strength.

Average strength 6,932

Diseases.	Admissions.	Deaths.	Average number constantly sick.	Ratio per 1,000. Admissions.	Deaths.	Constantly sick.
Specific Diseases due to infection or infestation.						
Cholera	..	..	..	..	..	..
Dengue	10	..	0·16	1·4	..	0·02
Diphtheria	24	2	1·84	3·5	0·29	0·27
Dysentery Bacillary	71	4	·20	10·2	0·58	0·46
„ exudate	63	4	2·09	9·1	0·58	0·30
„ amœbic	8	..	0·69	1·2	..	0·10
clinical	19	1	1·16	2·7	0·14	0·17
Enteric fever (inclusive of typhoid, para. A, B and enteric group).	23	1	2·77	3·3	0·14	0·40
Erysipelas	1	..	0·14	0·1	..	0·02
Influenza	38	..	0·90	5·5	..	0·13
Malaria	140	2	4·37	20·2	0 29	0·63
Measles	60	1	2·33	8·7	0·14	0·34
Meningococcal infection (cerebro-spinal fever)	..	..	..	..	..	..
Mumps	4	..	0·28	0 6	..	0·04
Plague	..	..	..	..	..	..
Pneumonia	62	12	2·65	8·9	1·73	0·38
Pyrexia of uncertain origin	1	..	0·02	0·1	..	0·00
Rheumatic fever	7	..	1·07	1·0	..	0·15
Sandfly fever	32	..	0·52	4·6	..	0·08
Scarlet fever	13	..	0·73	1·9	..	0·11
Small pox	1	..	0·07	0·1	..	0·01
Scabies	..	..	..	..	..	..
Tuberculosis { Pulmonary	3	2	0·20	0·4	0·29	0·03
Tuberculosis { Other	3	..	0·29	0·4	..	0·03

Venereal diseases. Gonorrhœa	2	..	0·96	0·3	..	0·14
Venereal diseases. Soft chancre	..	..	..	..	..	..
Venereal diseases. Syphilis	..	..	..	..	..	..
Venereal diseases. Other V. D.	..	..	..	..	..	..
Typhus fever	3	..	0·10	0·4	..	0·01
Other diseases due to infection or infestation	119	2	2·14	17·2	0·29	0·31
Other Diseases classified under systems.						
Diseases of the nervous system	16	6	0·70	2·3	0·87	0·10
Mental diseases	1	..	0·02	0·1	..	0·00
Diseases of the eye	18	..	0·39	2·6	..	0·06
Diseases of the ear and nose	61	..	1·74	8·8	..	0·25
Diseases of the Circulatory system. Valvular diseases of the heart	..	..	..	..	..	..
Diseases of the Circulatory system. Disordered action of the heart	5	1	0·14	0·7	0·14	0·02
Diseases of the Circulatory system. Other diseases	3	..	0·37	0·4	..	0·05
Diseases associated with abnormalities of the blood	5	..	0·17	0·7	..	0·02
Diseases of the spleen	..	..	..	..	..	..
Diseases of the lymphatic system	35	..	1·10	5·0	..	0·16
Diseases of Ductless or endocrine glands	..	..	..	..	..	..
Diseases of the breast	..	..	..	..	..	..
Diseases of the Respiratory system. Larynx and trachea	7	..	0·14	1·0	..	0·02
Diseases of the Respiratory system. Bronchi and bronchioles	186	..	4·08	26·8	..	0·59
Diseases of the Respiratory system. Lung, other than tuberculosis and pneumonia.	5	3	0·08	0·7	0·43	0·01
Diseases of the Respiratory system. Other diseases.	1	..	0·18	0·1	..	0·03
Diseases of the teeth and gums	19	..	0·29	2·7	..	0·04
Diseases of the Digestive system. Inflammation of tonsils	171	..	2·90	24·7	..	0·42
Diseases of the Digestive system. Liver diseases	6	..	0·21	0·9	..	0·03
Diseases of the Digestive system. Other diseases	493	14	10·87	71·1	2·00	1·57
Diseases due to disorders of nutrition or of metabolism	43	11	2·24	6·2	1·59	0·32
Diseases of the generative system	48	12	1·18	6·9	1·73	0·17
Diseases of Bones, Joints, Muscles, Fascia and Bursæ	11	..	0·45	1·6	..	0·06
Diseases of the areolar tissue	75	2	2·44	10·8	0·29	0·35
Diseases of the skin	35	..	1·40	5·0	..	0·20
Diseases of the urinary organs	26	..	1·30	3·8	..	0·19
Injuries. General	..	..	..	..	..	..
Injuries. Local	73	..	3·34	10.5	..	0·48
Injuries. In action	..	..	..	..	..	..
Tumours and cysts	1	..	0·04	0·1	..	0·01
Malformations	4	2	0·12	0·6	0·29	0·02
Poisons	2	..	0·09	0·3	..	0·01
Parasites	..	..	..	..	..	..
No appreciable disease	20	..	0·41	2·9	..	0·06
Suicides	..	..	..	..	..	..
Total	2,077	82	64·95	299·6	11·8	9·37

TABLE XII.

BRITISH OTHER RANKS.

Table showing admission and death ratios per 1,000 of Strength by Commands contrasted with the previous year, and the average for the previous five years.

Commands.		Enteric group of fevers.		Influenza.		Cholera.		Small-pox.		Malaria.		Dysentery.	
		A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.
Northern Command	1929-33	5·1	0·37	22·2	..	0·0	0·01	0·1	..	157·7	0·10	22·5	0·01
	1933	3·5	0·23	17·3	..	..	..	0·2	..	159·8	0·06	21·3	..
	1934	1·8	0·17	14·3	..	..	..	..	..	75·8	..	20·4	..
Western Command	1929-33	4·1	0·15	27·2	0·15	..	..	0·1	..	140·2	..	28·8	..
	1933	1·9	..	41·4	..	..	..	..	..	204·0	..	40·4	..
	1934	1·5	..	33·9	..	..	..	..	..	160·4	..	46·7	..
Eastern Command	1929-33	3·5	0·29	15·2	0·02	0·1	..	0·1	..	81·3	0·06	22·2	0·04
	1933	5·2	0·56	29·1	0·12	..	..	0·3	..	62·6	..	23·9	0·06
	1934	2·3	0·13	15·2	..	0·3	..	0·3	..	48·1	0·06	23·5	..
Southern Command	1929-33	2·1	0·17	8·4	0·01	..	..	0·1	..	75·2	0·08	26·9	..
	1933	1·1	0·07	12·0	0·07	..	..	0·1	..	60·6	0·13	26·7	..
	1934	1·1	0·13	17·1	..	..	..	0·1	..	55·3	0·07	29·9	..
Burma District	1929-33	1·3	..	18·4	..	..	..	..	..	47·7	0·11	19·6	..
	1933	1·1	..	8·3	..	..	..	..	..	39·3	..	20·0	..
	1934	0·6	..	5·0	..	..	..	..	..	54·9	..	18·3	..
All-India	1929-33	3·5	0·26	16·3	0·02	0·0	0·00	0·1	..	106·4	0·09	23·7	0·01
	1933	3·1	0·25	20·8	0·05	..	..	0·2	..	103·3	0·05	25·0	0·02
	1934	1·7	0·13	16·5	..	0·1	..	0·1	..	67·5	0·04	25·5	..

Commands.		Pyrexia of uncertain origin.		Pneumonia, lobar and lobular.		Venereal diseases.		Dengue.		Sand-fly fever.		Plague.	
		A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.
Northern Command	1929-33	2·0	..	5·0	0·45	30·1	..	0·8	..	91·6	..	..	..
	1933	0·9	..	4·0	0·23	27·2	..	0·3	..	85·9	..	..	..
	1934	1·3	..	5·9	0·23	25·0	..	0·3	..	79·8	..	..	..
Western Command	1929-33	2·1	..	3·5	0·54	32·7	..	3·6	..	9·4	..	..	..
	1933	..	..	2·7	0·48	25·9	..	3·6	..	2·7	..	..	..
	1934	..	..	3·5	..	24·8	..	3·2	..	7·9	..	..	..
Eastern Command	1929-33	0·9	..	4·0	0·34	45·4	..	13·4	..	26·6	..	..	..
	1933	0·3	..	4·4	0·19	37·7	..	7·3	..	28·9	..	..	..
	1934	0·4	..	3·3	0·25	40·4	..	2·7	..	22·6	..	..	..
Southern Command	1929-33	2·7	..	3·1	0·27	39·6	0·01	10·8	..	20·4	..	..	..
	1933	2·8	..	2·8	0·39	32·7	..	15·9	..	15·6	..	..	..
	1934	1·1	..	2·6	0·20	34·5	..	13·3	..	12·5	..	..	..
Burma District	1929-33	1·0	..	3·0	0·22	107·3	..	59·6	..	1·8	..	0·1	0·11
	1933	..	..	1·7	..	78·1	..	146·1	..	7·2	..	..	..
	1934	..	..	2·2	..	84·3	..	52·7	..	0·6	..	..	..
All-India	1929-33	1·8	..	3·9	0·37	39·6	0·00	9·5	..	42·5	..	0·0	0·00
	1933	1·1	..	3·6	0·27	33·4	..	11·7	..	40·9	..	..	..
	1934	0·8	..	3·9	0·20	34·2	..	6·6	..	36·2	..	..	..

A.—Admissions. D.—Deaths.

TABLE XIII.

VACCINATION PERFORMED IN THE BRITISH AND INDIAN ARMIES DURING 1934—OFFICERS AND OTHER RANKS.

Commands	British Troops. Officers. Number. P.	R.	Officers. Percentage of successful cases to total operations. P.	R.	Warrant, N. C. Officers and men. Number. P.	R.	Percentage of successful cases to total operations. P.	R.
Northern	1	81	100	95	2	3,079	50	86
Western	..	34	..	100	3	750	100	77
Eastern	4	95	75	83	23	3,267	74	55
Southern	..	119	..	64	6	4,102	83	61
Burma District	..	18	..	78	..	403	..	84
Total	5	347	80	81	34	11,601	76	68

Commands.	Indian Troops. European officers. Number. P.	R.	European officers. Percentage of successful cases to total operations. P.	R.	Indian commissioned, Non-commissioned officers and men. Number. P.	R.	Percentage of successful cases to total operations. P.	R.	Followers. Number. P.	R.	Percentage of successful cases to total operations. P.	R.
Northern	..	127	..	94	235	14,746	88	88	50	3,691	100	84
Western	1	33	..	91	..	2,987	..	96	...	772	..	92
Eastern	..	53	..	72	548	10,038	84	79	9	1,684	78	68
Southern	4	86	100	66	72	7,866	97	66	28	2,731	100	58
Burma District	..	7	..	100	..	718	..	90	..	73	..	78
Total	5	306	80	82	855	36,355	86	81	82	8,951	93	73

P.—Primary. R.—Revaccinations.

TABLE XIV.

VACCINATION PERFORMED IN THE FAMILIES—BRITISH ARMY DURING 1934.

Commands.	Women.				Children.			
	Number.		Percentage of successful cases to total operations.		Number.		Percentage of successful cases to total operations.	
	P.	R.	P.	R.	P.	R.	P.	R.
Northern	..	239	..	95	207	302	88	92
Western	..	51	..	78	52	56	100	80
Eastern	7	253	71	68	137	354	80	69
Southern	4	326	100	67	214	322	71	82
Burma District	..	36	..	86	33	27	76	81
Total	11	905	82	76	643	1,061	81	81

TABLE XV.

VACCINATION PERFORMED IN THE FAMILIES—INDIAN ARMY DURING 1934.

Commands.	Women.				Children.			
	Number.		Percentage of successful cases to total operations.		Number.		Percentage of successful cases to total operations.	
	P.	R.	P.	R.	P.	R.	P.	R.
Northern	..	68	..	96	7	26	100	92
Western	..	10	..	80	4	6	100	100
Eastern	23	61	52	97	49	71	82	96
Southern	..	28	..	64	6	22	100	86
Burma District	..	3	..	100	..	4	..	100
Total	23	170	52	90	66	129	86	94

SECTION II.

INDIAN ARMY, 1934

TABLE B.

STATIONS BY COMMANDS AND INDEPENDENT DISTRICTS.

Stations.	Height above M. S. level in feet.*	Authority for height.	Points of reference.
Northern Command.			
Abbottabad	4,010	S. D.	Map.
Ambala	902	,,	S.B.M.
Amritsar	754	,,	,,
Bakloh	4,585	,,	Map.
Bannu	1,250	,,	,,
Campbellpore	1,180	,,	,,
Cherat and Chappri	4,546	,,	,,
Chitral	4,980	,,	,,
Dagshai	6,087	,,	,,
Dalhousie	7,687	,,	,,
Dera Ismail Khan	568	,,	S.B.M.
Dharamsala Cantt.	4,500	,,	Map.
Drosh Fort	4,340	,,	,,
Ferozepore	649	,,	S.B.M.
Jhelum	762	,,	,,
Jullundur Cantt.	771	,,	B.M.
Jutogh	6,870	,,	Map.
Kalabagh and Baragali	7,968	,,	,,
Kalabagh and Mari Indus	682	,,	,,
Kohat	1,725	,,	,,
Kuldana	7,049	S. G.	,,
Lahore Cantonment	706	S.D.	S.B.M.
Landikotal	3,509	,,	Map.
Lockhart Fort	6,613	,,	,,
Malakand	2,740	,,	,,
Manzai	1,650	,,	,,
Mardan	1,000	,,	,,
Mir Ali	2,940	S. G.	V.G.L.
Mona	3,500	S.D.	Map.
Multan	404	,,	S.B.M.
Nowshera (Ry. Station)	966	,,	B.M.
Peshawar	1,152	,,	S.B.M.
Rawalpindi	1,689	,,	,,
Razmak	6,556	,,	Map.
Sargodha (Railway Rest House)	615	,,	B.M.
Sialkot	829	,,	,,
Solon	5,078	,,	,,
Subathu	4,000	,,	Map.
Thall	2,450	,,	,,
Wana	4,530	,,	V.G.L.
Shagai	3,174	,,	B.M.
Western Command.			
Chaman Fort	5,502	S.D.	Map.
Fort Sandeman	4,600	,,	,,
Hindubagh	5,821	,,	,,
Hyderabad (Sind)	96	,,	S.B.M.
Karachi (Holy Trinity Church)	28	,,	,,
Lorlai	4,699	,,	Map.
Quetta	5,510	,,	S.B.M.
Eastern Command.			
Agra (Fort)	525	S.D.	S.B.M.
Alipore	17	,,	B.M.
Allahabad	314	,,	S.B.M.
Almora	5,494	S.D.	Map.
Bankura	..	..	..
Bareilly	563	S.D.	S.B.M.
Benares	256	,,	,,
Cawnpore	407	,,	B.M.
Chittagong	..	..	..
Comilla	..	..	..
Dacca	20	M.D.	..
Dehra Dun	2,232	S.D.	S.B.M.
Delhi	757	,,	,,
Dinapore	170	,,	Church.
Fategarh	467	,,	..
Fyzabad	330	,,	S.B.M.
Ghoom	7,313	,,	Jn. of road.
Gyantse	13,120	,,	Map.
Gorakhpore	..	..	..
Jhansi	849	S.D.	S.B.M.
Lansdowne	5,823	,,	Map.
Lucknow	383	,,	B.M.
Meerut	737	,,	S.B.M.
Midnapore	..	..	..
Muttra	560	S.D.	S.B.M.
Mymensingh	..	..	..
Nowgong	735	S.D.	B.M.
Roorkee	879	,,	S.B.M.
Saidpur	..	..	..
Shillong	4,921	S.D.	Map.
Southern Command.			
Ahmedabad	162	S.D.	S.B.M.
Ahmednagar	2,180	,,	Map.
Aurangabad	1,905	M.D.	,,
Bangalore	3,002	S.D.	S.B.M.
Baroda	114	,,	B.M.
Belgaum	2,523	,,	S.B.M.
Bombay (town hall)	20	,,	,,
Cannanore	40	,,	..
Deolali	1,894	,,	S.B.M.
Jubbulpore	1,320	,,	,,
Kamptee (Rly. Station).	940	,,	B.M.
Mhow (Ry. Station)	1,887	,,	,,
Mount Abu (Sanitorium)	3,836	,,	..
Neemuch	1,613	,,	..
Nasirabad	1,461	,,	B.M.
Pachmarhi	3,490	,,	,,
Poona	1,867	,,	S.B.M.
Saugor	1,755	,,	,,
St. Thos. Mount (Ry. Station)	34	,,	B.M.
Madras (Obsy.)	250	,,	,,
Trichinopoly	256	,,	S.B.M.
Trimulgherry	1,843	,,	Map.
Wellington Stn. Hospl.	5,800	,,	,,
Burma District.			
Mandalay (Fort Dufferin)	246	S.D.	Map.
Maymyo	3,508	,,	,,
Mingaladon	118	,,	,,

* These heights are usually those of the survey-marks or of the mercury surface in barometer cisterns of meteorological observatories.

S. D. = Survey Department (Map Publication Office).
S. G. = Surveyor-General of India.
S.B.M. = Standard Bench Mark.
B.M. = G. T. Bench Mark.
V.G.L. = Village Ground Level.
Map. = Heights taken from Topo. Maps.
M.D. = Meteorological Department.

TABLE XVI.

INDIAN OFFICERS AND INDIAN OTHER RANKS.

ALL INDIA.

Table showing the average strength, admissions into hospital, deaths, numbers invalided and constantly sick, during the year 1934, with ratios per 1,000 of the strength.

Diseases.	Average strength. 117,276.	Admissions.	Deaths.	Invalids.	Average number constantly sick.	Ratio per 1,000. Admissions.	Deaths.	Invalids.	Constantly sick.
Specific diseases due to infection or infestation.									
Cholera		1	..	..	0·05	0·0	..	..	0·00
Dengue		288	..	..	7·36	2·5	..	..	0·06
Diphtheria		10	..	..	0·70	0·1	..	..	0·01
Dysentery bacillary		652	4	..	24·42	5·6	0·03	..	0·21
,, ,, exudate		509	..	..	17·79	4·3	..	..	0·15
,, Protozoal		80	1	..	5·93	0·7	0·01	..	0·05
,, clinical		391	1	..	13·01	3·3	0·01	..	0·11
Enteric fevers (inclusive of typhoid, para A, B, & C, and enteric group).		224	15	1	32·96	1·9	0·13	0·01	0·28
Erysipelas		4	..	..	0·17	0·0	..	..	0·00
Influenza		1,234	1	..	24·03	10·5	0·01	..	0·20
Malaria		18,353	6	7	407·75	156·5	0·05	0·06	3·48
Measle-		131	..	..	5·93	1·1	..	..	0·05
Meningococcal infection (cerebro-spinal fever)		39	15	..	3·58	0·3	0·13	..	0·03
Mumps		953	..	..	47·41	8·1	..	..	0·40
Plague		..	..	..	..	..	..	..	..
Pneumonia		704	58	1	54·58	6·0	0·49	0·01	0·46
Pyrexia of uncertain origin		14	1	..	1·13	0·1	0·01	..	0·01
Rheumatic fever		101	..	7	8·35	0·8	..	0·06	0·07
Sandfly fever		970	..	..	17·29	8·3	..	..	0·15
Scarlet fever		..	..	..	..	..	..	..	..
Small pox		23	2	..	1·83	0·2	0·02	..	0·02
Scabies		1,317	..	..	40·43	11·1	..	..	0·84

TABLE XVI—*contd.*

Diseases.	Admissions.	Deaths.	Invalids.	Average number constantly sick.	Ratio per 1,000. Admissions.	Deaths.	Invalids.	Constantly sick.
Tuberculosis — Pulmonary	212	8	192	20·95	1·8	0·07	1·61	0·18
Tuberculosis — Other	41	5	31	6·52	0·3	0·04	0·26	0·05
Venereal diseases — Gonorrhœa	491	..	4	55·20	4·2	..	0·03	0·46
Venereal diseases — Soft chancre	229	..	..	21·96	1·9	..	..	0·18
Venereal diseases — Syphilis	409	*3	4	38·26	3·5	0·03	0·03	0·32
Venereal diseases — Other V. D.	1	..	..	0·03	0·0	..	..	0·00
Typhus fever	51	..	..	4·18	0·4	..	..	0·04
Other diseases due to infection or infestation	1,911	10	20	94·45	16·1	0·08	0·17	0·79
Other diseases classified under systems.								
Diseases of the nervous system	408	8	41	21·85	3·4	0·07	0·34	0·18
Mental diseases	120	1	40	9·21	1·0	0 01	0·34	0·08
Diseases of the eye	1,309	..	41	54·14	11·0	..	0·34	0·46
Diseases of the ear and nose	1,264	..	18	39·31	10·6	..	0·15	0·33
Diseases of the Circulatory system. — Valvular diseases of the heart	17	...	17	1·35	0·1	..	0·14	0·01
Diseases of the Circulatory system. — Disordered action of the heart	45	6	11	2· 8	0·4	0·05	0·09	0·02
Diseases of the Circulatory system. — Other diseases	51	8	5	2·57	0·4	0·07	0·04	0 02
Diseases associated with abnormalities of the blood	170	2	7	13·53	1·4	0·02	0·06	0·11
Diseases of the spleen	31	..	1	1·39	0 3	..	0 01	0 01
Diseases of the lymphatic system	201	..	6	14·34	1·7	..	0 05	0 12
Diseases of ductless or endocrine glands	13	..	3	0·79	0·1	..	0·03	0·01
Diseases of the breast	1	..	..	0·03	0·0	..	..	0 00
Diseases of the Respiratory system. — Larynx and trachea	122	..	2	4·02	1·0	..	0·02	0·03
Diseases of the Respiratory system. — Bronchi & bronchioles	1,783	..	14	61·48	15·0	..	0 12	0 52
Diseases of the Respiratory system. — Lung, other than tuberculosis and pneumonia.	18	3	2	1·86	0·2	0·03	0·02	0 02
Diseases of the Respiratory system. — Other diseases	209	3	10	18·97	1·8	0·03	0·08	0·16
Diseases of the teeth and gums	287	..	3	7·62	2·4	..	0·03	0·06
Diseases of the Digestive system. — Inflammation of the tonsils	637	..	1	13·32	5·4	..	0 01	0·11
Diseases of the Digestive system. — Liver diseases	194	9	1	11·71	1·6	0·08	0 01	0·10
Diseases of the Digestive system. — Other diseases	5191	17	13	140·65	43·6	0·14	0 11	1 18
Diseases due to disorders of nutrition or of metabolism	29	..	5	2·20	0·2	..	0·04	0 02
Diseases of the generative system	281	..	..	12·42	2·4	..	..	0·10
Diseases of Bones, Joints, Muscles, Fasciae and Bursae	1,073	1	46	48·67	9·0	0·01	0·39	0·41
Diseases of the areolar tissue	3,764	..	2	133·94	31·6	..	0·02	1·13
Diseases of the skin	1,399	..	5	57·16	11·8	..	0·04	0·48
Diseases of the urinary organs	257	7	4	11·36	2·2	0·06	0·03	0·10

*Includes 1 due to Haemorrhagic Encephalitis.

Injuries	General	44	6	..	0·95	0·4	0·05	..	0·01
	Local	5,832	44	94	264·85	49·0	0·37	0·79	2·23
	In action	..	..	..	..	..	..	..	..
Tumours and cysts		168	4	9	8·12	1·4	0·03	0·08	0·07
Malformations		5	..	..	0·26	0·0	..	..	0·00
Poisons		18	1	1	0·36	0·2	0·01	0·01	0·00
Parasites		2	..	..	0·09	0·0	..	..	0·00
No appreciable disease		39	..	..	1·46	0·3	..	..	0·01
Other causes		10	..	..	0·83	0·1	..	..	0·01
Suicides*		3	7	..	0·01	0·0	0·06	..	0·00
	Total	54,335	250	669	1,919·39	456·6	2·10	5·62	16·14

* The figures against "Suicides'" having already been shown under the heading of the injury, etc., which caused death, are not included in the total.

TABLE XVII.

INDIAN OFFICERS AND INDIAN OTHER RANKS.

NORTHERN COMMAND.

Table showing the average strength, admissions into hospital, deaths, number invalided and constantly sick, during the year 1934, with ratios per 1,000 of the strength.

Diseases.	Admissions.	Deaths.	Invalids.	Average number constantly sick.	Ratio per 1,000. Admissions.	Deaths.	Invalids.	Constantly sick.
Average strength, 56,628.								
Specific Diseases due to infection or infestation.								
Cholera	....	....	....	....	....	....	....	....
Dengue	....	....	....	....	....	....	....	....
Diphtheria	....	....	....	....	....	....	....	....
Dysentery bacillary	253	1	...	9·90	4·5	0·02	...	0·17
,, ,, exudate	195	...	...	6·88	3·4	...	...	0·12
,, Protozoal	12	...	...	0·98	0·2	...	...	0·02
,, clinical	236	...	...	7·92	4·2	...	...	0·14

TABLE XVII—*contd.*

Diseases. Average strength, 56,628—*contd.*	Admissions.	Deaths.	Invalids.	Average number constantly sick.	Ratio per 1,000. Admissions.	Deaths.	Invalids.	Constantly sick.
Specific Diseases due to infection or infestation—contd.								
Enteric fever (inclusive of typhoid, para A, B & C, and enteric group).	96	10	1	14·20	1·7	0·18	0·02	0·25
Erysipelas	3	...	...	0·11	0·1	...	...	0·00
Influenza	718	...	...	13·21	12·7	...	...	0·23
Malaria	10,895	5	4	226·21	192·4	0·09	0·07	3·99
Measles	38	...	...	1·63	0·7	...	...	0·03
Meningococcal infection (cerebro-spinal fever)	19	8	...	1·59	0·3	0·14	...	0·03
Mumps	519	...	...	25·97	9·2	...	...	0·46
Plague	...	...	...	...	...	...	...	...
Pneumonia	421	35	1	31·47	7·4	0·62	0·02	0·56
Pyrexia of uncertain origin	6	...	...	0·49	0·1	...	...	0·01
Rheumatic fever	42	...	5	3·37	0·7	...	0·09	0·06
Sandfly fever	838	...	...	15·01	14·8	...	...	0·27
Scarlet fever.	...	...	...	...	...	...	...	...
Small-pox	5	1	1	0·54	0·1	0·02	...	0·01
Scabies	621	...	...	18·93	11·0	...	...	0·33
Tuberculosis — Pulmonary	113	7	98	10·78	2·0	0·12	1·73	0·19
Tuberculosis — Other	17	2	10	2·71	0·3	0·04	0·18	0·05
Venereal diseases — Gonorrhœa	200	...	1	24·00	3·5	...	0·02	0·42
Venereal diseases — Soft chancre	98	...	...	8·84	1·7	...	...	0·16
Venereal diseases — Syphilis	144	2	2	14·25	2·5	0·04	0·04	0·25
Venereal diseases — Other V. D.	...	...	...	...	...	...	...	...
Typhus fever	...	...	...	...	...	...	...	...
Other diseases due to infection or infestation	811	6	10	41·45	14·3	0·11	0·18	0·73
Other Diseases classified under systems.								
Diseases of the nervous system	174	7	11	9·74	3·1	0·12	0·19	0·17
Mental diseases	57	1	15	4·36	1·0	0·02	0·26	0·08
Diseases of the eye	628	...	14	25·37	11·1	...	0·25	0·45
Diseases of the ear and nose	589	...	9	22·13	10·4	...	0·16	0·39

Diseases of the Circulatory system.	Valvular diseases of the heart	4	...	8	0·48	0·1	...	0·05	0·05
	Disordered action of the heart	16	3	5	1·05	0·3	0·05	0·09	0·02
	Other diseases	24	2	3	1·32	0·4	0·04	0·05	0·02
Diseases associated with abnormalities of the blood		73	...	1	6·30	1·3	...	0·02	0·11
Diseases of the spleen		15	...	1	0·53	0·3	...	0·02	0·01
Diseases of the lymphatic system		74	...	4	5·31	1·3	...	0·07	0·09
Diseases of ductless or endocrine glands		4	...	2	0·32	0·1	...	0·04	0·01
Diseases of the breast		1	...	...	0·02	0·0	...	...	0·00
Diseases of the Respiratory system.	Larynx and trachea	38	...	...	1·41	0·7	...	...	0·02
	Bronchi and bronchioles	864	...	2	29·44	15·3	...	0·04	0·52
	Lung, other than tuberculosis and pneumonia.	11	1	2	1·14	0·2	0·02	0·04	0·02
	Other diseases	109	...	6	10·64	1·9	...	0·11	0·19
Diseases of the teeth and gums		153	...	1	3·32	2·7	...	0·02	0·06
Diseases of the Digestive system.	Inflammation of tonsils	298	...	...	5·91	5·3	...	...	0·10
	Liver diseases	86	3	...	4·98	1·5	0·05	...	0·09
	Other diseases	2,612	7	2	63·92	46·1	0·12	0·04	1·13
Diseases due to disorders of nutrition or of metabolism		16	...	2	1·14	0·3	...	0·04	0·02
Diseases of the generative system		98	...	...	4·37	1·7	...	...	0·08
Diseases of Bones, Joints, Muscles, Fasciae and Bursae		487	...	24	23·22	8·6	...	0·42	0·41
Diseases of the areolar tissue		1,867	...	...	65·56	33·0	...	...	1·16
Diseases of the skin		635	...	3	26·17	11·2	...	0·05	0·46
Diseases of the urinary organs		131	4	1	5·52	2·3	0·07	0·02	0·10
Injuries	General	25	5	...	0·50	0·4	0·09	...	0·01
	Local	2,947	10	41	132·63	52·0	0·34	0·72	2·34
	In action.	...	...	...	...	...	...	...	...
Tumours and cysts		96	3	4	4·13	1·7	0·05	0·07	0·07
Malformations		2	...	...	0·12	0·0	...	...	0·00
Poisons		11	1	...	0·22	0·2	0·02	...	0·00
Parasites		1	...	...	0·05	0·0	...	...	0·00
No appreciable disease		15	...	...	0·59	0·3	...	...	0·01
Other causes		1	...	...	0·07	0·0	...	...	0·00
Suicides*		1	2	...	0·00	0·0	0·04	...	0·00
Total		28,462	133	288	942·42	502·6	2·35	5·09	16·64

*The figures against "Suicides" having already been shown under the heading of the injury, etc., which caused death, are not included in the total.

TABLE XVIII.

INDIAN OFFICERS AND INDIAN OTHER RANKS.

WESTERN COMMAND.

Table showing the average strength, admissions into hospital, deaths, number invalided and constantly sick, during the year 1934, with ratios per 1,000 of the strength.

Diseases.	Admissions.	Deaths.	Invalids.	Average number constantly sick.	Ratio per 1,000. Admissions.	Deaths.	Invalids.	Constantly sick.
Average strength, 12,808.								
Specific Diseases due to infection or infestation.								
Cholera	..	..	..	..	..	..	..	..
Dengue	..	..	..	..	..	..	..	..
Diphtheria	..	..	..	..	..	..	..	..
Dysentery bacillary	145	1	..	4·31	11·3	0·08	..	0·34
Dysentery bacillary exudate	97	..	..	2·99	7·6	..	..	0·23
Dysentery protozoal	7	1	..	0·49	0·5	0·08	..	0·04
Dysentery clinical	57	..	..	1·76	4·4	..	..	0·14
Enteric fevers (inclusive of typhoid, para. A, B & C and enteric group)	33	..	..	6·03	2·6	..	..	0·47
Erysipelas	..	..	..	..	..	..	..	..
Influenza	39	..	..	0·71	3·0	..	..	0·06
Malaria	2,658	..	1	64·75	207·5	..	0·08	5·06
Measles	15	..	..	0·65	1·2	..	..	0·05
Meningococcal infection (cerebro-spinal fever)	2	..	..	0·21	0·2	..	..	0·02
Mumps	99	..	..	4·60	7·7	..	..	0·36
Plague	..	..	..	..	..	..	..	..
Pneumonia	51	4	..	3·95	4·0	0·31	..	0·31
Pyrexia of uncertain origin	1	..	..	0·13	0·1	..	..	0·01
Rheumatic fever	7	..	..	0·89	0·5	..	..	0·07
Sand-fly fever	53	..	..	0·93	4·1	..	..	0·07
Scarlet fever	..	..	..	..	..	..	..	..
Small-pox	1	..	..	0·07	0·1	..	..	0·01
Scabies	46	..	..	1·92	3·6	..	..	0·15
Tuberculosis — Pulmonary	15	1	14	1·90	1·2	0·08	1·09	0·15
Tuberculosis — Other		..	8	0·96	0·5	..	0·62	0·07

Venereal diseases.	Gonorrhœa	35	..	..	3·49	2·7	..	..	0·27
	Soft chancre	15	..	..	1·00	1·2	..	..	0·08
	Syphilis	20	..	..	2·43	1·6	..	..	0·19
	Other V. D.	..	..	..	..	..	..	..	..
Typhus fever		2	..	..	0·18	0·2	..	..	0·01
Other diseases due to infection or infestation		247	1	5	10·83	19·3	0·08	0·39	0·85
Other diseases classified under systems.									
Diseases of the nervous system		45	..	3	2·52	3·5	..	0·23	0·20
Mental diseases		17	..	5	1·23	1·3	..	0·39	0·07
Diseases of the eye		65	..	5	3·56	5·1	..	0·39	0·28
Diseases of the ear and nose		48	..	2	1·59	3·7	..	0·16	0·12
Diseases of the Circulatory system.	Valvular diseases of the heart	..	..	..	..	..	..	..	..
	Disordered action of the heart	2	..	..	0·12	0·2	..	..	0·01
	Other diseases	4	3	..	0·22	0·3	0·23	..	0·02
Diseases associated with abnormalities of the blood		39	2	..	2·55	3·0	0·16	..	0·20
Diseases of the spleen		2	..	..	0·10	0·2	..	..	0·01
Diseases of the lymphatic system		21	..	1	1·33	1·6	..	0·08	0·10
Diseases of the ductless or endocrine glands		2	..	..	0·09	0·2	..	..	0·01
Diseases of the breast		..	..	..	..	..	..	..	..
Diseases of the Respiratory system.	Larynx and trachea	12	..	..	0·29	0·9	..	..	0·02
	Bronchi and bronchioles	156	..	1	5·04	12·2	..	0·08	0·39
	Lung, other than tuberculosis and pneumonia.	..	..	..	..	..	..	..	..
	Other diseases.	13	1	1	1·10	1·0	0·08	0·08	0·09
Diseases of the teeth and gums		17	..	..	0·34	1·3	..	..	0·03
Diseases of the Digestive system.	Inflammation of tonsils	52	..	..	0·94	4·1	..	..	0·07
	Liver diseases	16	..	..	0·86	1·2	..	..	0·07
	Other diseases	426	3	1	13·20	33·3	0·23	0·08	1·03
Diseases due to disorders of nutrition or of metabolism		2	..	2	0·30	0·2	..	0·16	0·02
Diseases of the generative system		24	..	..	1·10	1·9	..	..	0·09
Diseases of Bones, Joints, Muscles, Fasciae, and Bursae		102	..	4	4·31	8·0	..	0·31	0·34
Diseases of the areolar tissue		160	..	..	5·55	12·5	..	..	0·43
Diseases of the skin		113	..	..	4·59	8·8	..	..	0·36
Diseases of the urinary organs		16	..	..	0·51	1·2	..	..	0·04
Injuries	General	1	..	..	0·03	0·1	..	..	0·00
	Local	455	6	10	19·79	35·5	0·47	0·78	1·55
	In action.	..	..	..	..	..	..	..	..
Tumours and cysts		14	..	3	1·23	1·1	..	0·23	0·10
Malformations		..	..	..	..	..	..	..	..
Poisons		..	..	..	..	..	..	..	..
Parasites		..	..	..	..	..	..	..	..
No appreciable disease		5	..	..	0·38	0·4	..	..	0·03
Other causes		..	..	..	..	..	..	..	..
Suicides*		1	2	..	0·00	0·1	0·16	..	0·00
	Total	5,480	23	66	188·05	427·9	1·80	5·15	14·68

*The figures against "suicides" having already been shown under the heading of the injury, etc, which caused death, are not included in the total.

TABLE XIX.

INDIAN OFFICERS AND INDIAN OTHER RANKS.

EASTERN COMMAND.

Table showing the average strength, admissions into hospital, deaths, number invalided and constantly sick, during the year 1934, with ratios per 1,000 of the Strength.

Diseases.	Admissions.	Deaths.	Invalids.	Average number constantly sick.	Ratio per 1,000. Admissions.	Deaths.	Invalids.	Constantly sick.
Average strength, 23,570.								
Specific diseases due to infection or infestation.								
Cholera	1	...	...	0·05	0·0	...	...	0·00
Dengue	15	...	...	0·27	0·6	...	...	0·01
Diphtheria	9	...	...	0·68	0·4	...	...	0·03
Dysentery bacillary	95	2	...	3·51	4·0	0·08	...	0·15
Dysentery bacillary exudate	76	...	...	2··6	3·2	...	...	0·11
Dysentery protozoal	37	...	...	2·02	1·6	...	...	0·11
Dysentery clinical	66	...	...	2·15	2·8	...	...	0·09
Enteric fevers (inclusive of typhoid, para. A, B, & C, and enteric group)	49	2	...	6·45	2·1	0·08	...	0·27
Erysipelas	...	...	...	...	...	...	...	...
Influenza	245	1	...	4·99	10·4	0·04	...	0·21
Malaria	2,670	1	...	69·22	113·3	0·04	...	2·94
Measles	61	...	...	2·77	2·6	...	...	0·12
Meningococcal infection (cerebro-spinal fever)	12	4	...	1·36	0·5	0·17	...	0·06
Mumps	275	...	...	13·36	11·7	...	...	0·57
Plague	...	...	...	...	...	...	...	...
Pneumonia	131	12	...	11·67	5·6	0·51	...	0·50
Pyrexia of uncertain origin	2	...	...	0·21	0·1	...	...	0·01
Rheumatic fever	18	...	1	1·84	0·8	0·04	...	0·08
Sand-fly fever	25	...	...	0·53	1·1	...	...	0·02
Scarlet fever	...	...	...	...	...	...	...	...
Small-pox	7	1	...	0·47	0·3	0·04	...	0·02
Scabies	367	...	...	10·87	15·6	...	...	0·46
Tuberculosis — Pulmonary	48	...	45	4·66	2·0	...	1·91	0·20
Tuberculosis — Other	8	1	7	1·72	0·3	0·04	0·30	0·07

Venereal diseases	Gonorrhœa	124	...	...	13·78	5·3	...	...	0·58
	Soft chancre	60	...	...	6·14	2·5	...	...	0·26
	Syphilis	100	...	...	8·58	4·2	...	...	0·36
	Other V. D.	1	...	...	0·03	0·0	...	...	0·00
Typhus fever		8	...	...	0·85	0·3	...	...	0·04
Other diseases due to infection or infestation		393	2	2	18·21	16·7	0·08	0·08	0·77
Other diseases classified under systems.									
Diseases of the nervous system		83	...	12	3·87	3·5	...	0·51	0·16
Mental diseases		22	...	11	1·72	0·9	...	0·47	0·07
Diseases of the eye		335	...	10	13·47	14·2	...	0·42	0·57
Diseases of the ear and nose		256	...	3	6·87	10·9	...	0·13	0·29
Diseases of the Circulatory system.	Valvular diseases of the heart	6	...	4	0·36	0·3	...	0·17	0·02
	Disordered action of the heart	15	1	3	0·58	0·6	0·04	0·13	0.02
	Other diseases	13	2	2	0·65	0·6	0·08	0·08	0·03
Diseases associated with abnormalities of the blood		31	...	3	2·55	1·3	...	0·13	0·11
Diseases of the spleen		8	...	...	0·32	0·3	...	...	0·01
Diseases of the lymphatic system		40	...	...	2·59	1·7	...	...	0·11
Diseases of ductless or endocrine glands		5	...	...	0·25	0·2	...	...	0·01
Diseases of the breast		...	...	...	0·01	...	...	...	0·00
Diseases of the respiratory system.	Larynx and trachea	29	...	2	1·02	1·2	...	0·08	0·04
	Bronchi and bronchioles.	430	...	2	14·42	18·2	...	0·08	0·61
	Lung other than tuberculosis and pneumonia.	5	2	...	0·48	0·2	0·08	...	0·02
	Other diseases	46	2	2	3·81	2·0	0·08	0·08	0·16
Diseases of the teeth and gums		51	...	2	1·51	2·2	...	0·08	0·06
Diseases of the Digestive system.	Inflammation of the tonsils	137	...	...	3·16	5·8	...	...	0·13
	Liver diseases	51	3	1	3·40	2·2	0·18	0·04	0·14
	Other diseases	1,150	6	4	34·48	48·8	0·25	0·17	1·46
Diseases due to disorders of nutrition or of metabolism		4	...	...	0·30	0·2	...	...	0·01
Diseases of the generative system		93	...	...	3·64	3·9	...	...	0·15
Diseases of Bones, Joints, Muscles, Fasciæ and Bursæ		232	1	5	9·60	9·8	0·04	0·21	0·41
Diseases of the areolar tissue		801	...	2	31·05	34·0	...	0·08	1.32
Diseases of the skin		368	...	1	14·27	15·6	...	0·04	0·61
Diseases of the urinary organs		67	2	2	3·52	2·8	0·08	0·08	0·15
Injuries	General	5	...	...	0·10	0·2	...	...	0·00
	Local	1,233	18	27	60·26	52·3	0·55	1·15	2·56
	In action	...	...	...	...	...	...	...	..
Tumours and cysts		21	...	2	1·07	0·9	...	0·08	0·05
Malformations		2	...	...	0·12	0·1	...	...	0·00
Poisons		4	...	1	0·07	0·2	...	0·04	0·00
Parasites		...	...	...	...	...	...	...	...
No appreciable disease		10	...	...	0·25	0·4	...	...	0·01
other causes		6	...	...	0·48	0·3	...	...	0·02
Suicides*		...	(1)	...	...	...	0·04	...	...
	Total	10,462	58	156	409·90	443·9	2·46	6·62	17·39

* The figures against "Suicides" having already been shown under the headings of the injury, etc., which caused death, are not included in the total.

TABLE XX.

INDIAN OFFICERS AND INDIAN OTHER RANKS.

SOUTHERN COMMAND.

Table showing the average strength, admissions into hospital, deaths, number invalided and constantly sick, during the year 1934, with ratios per 1,000 of the strength.

Diseases.	Admissions.	Deaths.	Invalids.	Average number constantly sick.	Ratio per 1,000.			
					Admissions.	Deaths.	Invalids.	Constantly sick.
Average strength, 21,178.								
Specific diseases due to infection or infestation.								
Cholera	...	...	...	...	...	...	...	...
Dengue	71	...	...	2·09	3·4	...	...	0·10
Diphtheria	...	...	...	...	...	...	...	...
Dysentery bacillary	145	...	...	5·96	6·8	..	...	0·28
Dysentery bacillary exudate	138	...	...	5·14	6·5	...	...	0·24
Dysentery protozoal	17	...	...	1·18	0·8	...	...	0·06
Dysentery clinical	29	1	...	1·06	1·4	0·05	...	0·05
Enteric fevers (inclusive of typhoid, para, A, B, and C, and enteric group)	40	3	...	5·64	1·9	0·14	...	0·27
Erysipelas	1	...	...	0·06	0·0	...	...	0·00
Influenza	181	...	...	4·15	8·5	...	...	0·20
Malaria	1,767	..	2	38·88	83·4	..	·0·09	1·84
Measles	8	...	...	0·41	0·4	...	...	0·02
Meningococcal infection (cerebro-spinal fever)	6	3	...	0·42	0·3	0·14	...	0·02
Mumps	55	...	...	3·25	2·6	...	...	0·15
Plague	..	..	...	...	...	...	...	...
Pneumonia	87	6	...	6·00	4·1	0·28	...	0·28
Pyrexia of uncertain origin	5	1	...	0·30	0·2	0·05	...	0·01
Rheumatic fever	33	...	1	2·21	1·6	...	0·05	0·10
Sand-fly fever	54	...	...	0·82	2·5	...	...	0·04
Scarlet fever	..	...	...	...	...	...	...	...
Small-pox	9	...	...	0·70	0·4	...	...	0·03
Scabies	225	..	...	6·60	10·6	...	...	0·31
Tuberculosis—Pulmonary	28	...	26	2·92	1·3	...	1·23	0·14
Tuberculosis—Other	6	...	5	0·75	0·3	...	0·24	0·04

Venereal diseases	Gonorrhœa	86	...	1	9·17	4·1	...	0·05	0·48
	Soft chancre	43	...	...	3·88	2·0	...	...	0·18
	Syphilis	93	†1	2	7·30	4·4	0·05	0·09	0·34
	Other V. D.	...	...	...	...	...	...	...	...
Typhus fever		41	...	...	3·15	1·9	...	...	0·15
Other diseases due to infection or infestation		390	1	2	21·61	18·4	0·05	0·09	1·02
Other diseases classified under systems.									
Diseases of the nervous system		83	1	13	4·91	3·9	0·05	0·61	0·23
Mental diseases		20	...	8	1·39	0·9	...	0·38	0·07
Diseases of the eye		235	...	12	9·93	11·1	...	0·57	0·47
Diseases of the ear and nose		285	...	4	7·15	13·5	...	0·19	0·34
Diseases of the circulatory system.	Valvular diseases of the heart	7	...	10	0·51	0·3	...	0·47	0·02
	Disordered action of the heart	10	2	3	0·46	0·5	0·09	0·14	0·02
	Other diseases	9	...	...	0·34	0·4	...	...	0·02
Diseases associated with abnormalities of the blood		22	...	3	1·67	1·0	...	0·14	0·08
Diseases of the spleen		5	...	...	0·29	0·2	...	...	0·01
Diseases of the lymphatic system		48	...	...	3·60	2·3	...	...	0·17
Diseases of ductless or endocrine glands		2	...	1	0·13	0·1	...	0·05	0·01
Diseases of the breast		...	...	...	...	...	...	...	...
Diseases of the Respiratory system.	Larynx and trachea	35	...	...	1·11	1·7	...	...	0·05
	Bronchi and bronchioles	266	...	6	9·72	12·6	...	0·28	0·46
	Lung, other than tuberculosis and pneumonia	1	...	...	0·13	0·0	...	...	0·01
	Other diseases	30	...	1	2·20	1·4	...	0·05	0·10
Diseases of the teeth and gums		53	...	...	1·95	2·5	...	...	0·09
Diseases of the digestive system.	Inflammation of the tonsils	123	...	1	2·65	5·8	...	0·05	0·13
	Liver diseases	34	3	...	1·88	1·6	0·14	...	0·09
	Other diseases	718	1	6	20·96	33·9	0·05	0·28	0·99
Diseases due to disorders of nutrition or of metabolism		4	...	1	0·33	0·2	...	0·05	0·02
Diseases of the generative system		48	...	...	2·86	2·3	...	...	0·14
Diseases of Bones, Joints, Muscles, Fasciæ and Bursæ		201	...	11	8·20	9·5	...	0·52	0·39
Diseases of the areolar tissue		793	...	...	25·59	37·4	...	...	1·21
Diseases of the skin		214	...	1	9·93	10·1	...	0·05	0·47
Diseases of the urinary organs		38	1	1	1·59	1·8	0·05	0·05	0·08
Injuries	General	13	1	...	0·32	0·6	0·05	...	0·02
	Local	1,028	5	15	44·42	48·5	0·24	0·71	2·10
	In action	...	...	...	...	...	...	...	...
Tumours and cysts		24	1	...	1·17	1·1	0·05	...	0·06
Malformations		1	...	...	0·02	0·0	...	...	0·00
Poisons		2	...	...	0·06	0·1	...	...	0·00
Parasites		1	...	...	0·04	0.0	...	...	0·00
No appreciable disease		8	...	...	0·21	0·4	...	...	0·01
Other causes		3	...	...	0·28	0·1	...	...	0·01
Suicides*		...	1	...	...	...	0·05	...	...
	Total	7,922	31	136	299·65	374·1	1·46	6·42	14·15

*The figures against "Suicides" having already been shown under the heading of the Injury, etc, which caused death, are not included in the total.
†Died of haemorragic encephalities.

TABLE XXI.

INDIAN OFFICERS AND INDIAN OTHER RANKS.

BURMA DISTRICT.

Table showing the average strength, admissions into hospital, deaths, number invalided and constantly sick during the year 1934, with ratios per 1,000 of the strength.

Diseases.	Admissions.	Deaths.	Invalids.	Average number constantly sick.	Ratio per 1,000. Admissions.	Deaths.	Invalids.	Constantly sick.
Average strength, 3,092.								
Specific diseases due to infection or infestation.								
Cholera	...	...	...	...	...	...	...	...
Dengue	202	...	...	5·00	65·3	...	...	1·62
Diphtheria	1	...	...	0·02	0·3	...	...	0·01
Dysentery bacillary	14	...	...	0·74	4·5	...	...	0·24
,, ,, exudate	3	...	...	0·12	1·0	...	...	0·04
,, protozoal	7	...	...	0·66	2·3	...	...	0·21
,, clinical	3	...	...	0·12	1·0	...	...	0·04
Enteric fevers (inclusive of typhoid, para. A, B, & C, and enteric group).	6	...	...	0·64	1·9	...	...	0·21
Erysipelas	...	...	...	...	...	...	...	...
Influenza	51	...	...	0·97	16·5	...	...	0·31
Malaria	363	...	...	8·69	117·4	...	...	2·81
Measles	9	...	...	0·47	2·9	...	...	0·15
Meningococcal infection (cerebro-spinal fever)	...	...	...	...	...	...	...	...
Mumps	5	...	...	0·23	1·6	...	...	0·07
Plague	...	...	...	...	...	...	...	...
Pneumonia	14	1	...	1·44	4·5	0·32	...	0·47

Pyrexia of uncertain origin	...	...	...	...	...	...	...	...
Rheumatic fever	1	...	...	0·04	0·3	...	...	0·01
Sandfly fever	...	...	...	...	...	...	...	...
Scarlet fever	...	...	...	...	...	...	...	...
Small-pox	1	...	...	0·05	0.3	..	...	0·02
Scabies	58	...	...	2·11	18·8	...	...	0·68
Tuberculosis — Pulmonary	8	...	9	0·69	2·6	...	2·91	0·22
Tuberculosis — Other	4	2	1	0·38	1·3	0·65	0·32	0·12
Venereal diseases — Gonorrhœa	46	...	2	4·76	14·9	...	0·65	1·54
Venereal diseases — Soft chancre	13	...	...	2·10	4·2	...	...	0·68
Venereal diseases — Syphilis	52	...	...	5·70	16·8	...	...	1·84
Venereal diseases — Other V. D.	...	...	...	...	...	...	...	...
Typhus fever	...	...	...	...	...	...	...	...
Other diseases due to infection or infestation	70	...	1	2·35	22·6	...	0·32	0·76
Other diseases classified under systems.								
Diseases of the nervous system	23	...	2	0·81	7·4	...	0·65	0·26
Mental diseases	4	...	1	0·51	1·3	...	0·32	0·16
Diseases of the eye	46	...	...	1·81	14·9	...	...	0·59
Diseases of the ear and nose	86	...	...	1·57	27·8	...	...	0·51
Diseases of the circulatory system — Valvular diseases of the heart	...	...	...	...	...	...	...	...
Diseases of the circulatory system — Disordered action of the heart	2	...	...	0·17	0·6	...	...	0·05
Diseases of the circulatory system — Other diseases	1	1	...	0·04	0·3	0·32	...	0·01
Diseases associated with abnormalities of the blood	5	...	...	0·46	1·6	...	...	0·15
Diseases of the spleen	1	...	...	0·15	0·3	...	...	0·05
Diseases of the lymphatic system	18	...	1	1·51	5·8	...	0·32	0·49
Diseases of ductless or endocrine glands	...	...	...	...	...	...	...	...
Diseases of the breast	...	...	...	...	...	...	...	...
Diseases of the respiratory system — Larynx and trachea	8	...	...	0·19	2·6	...	...	0·06
Diseases of the respiratory system — Bronchi and bronchioles	67	...	3	2·86	21·7	...	0·97	0·92
Diseases of the respiratory system — Lung, other than tuberculosis and pneumonia	1	...	...	0·11	0·3	...	...	0·04
Diseases of the respiratory system — Other diseases	...	...	...	1·22	3·6	...	...	0·39

TABLE XXI—*contd.*

BURMA DISTRICT—*contd.*

Table showing the average strength, admissions into hospital, deaths, number invalided and constantly sick, during the year 1931, with ratios per 1,000 of the strength—contd.

Diseases.	Admissions.	Deaths.	Invalids.	Average number constantly sick.	Ratio per 1,000. Admissions.	Deaths.	Invalids.	Constantly sick
Average strength, 3,092—*contd.*								
Other diseases classified under systems—contd.								
Diseases of the teeth and gums	13	...	...	0·50	4·2	...	...	0·16
Diseases of the Digestive system. Inflammation of the tonsils	27	...	...	0·66	8·7	...	...	0·21
Diseases of the Digestive system. Liver diseases	7	...	...	0·59	2·3	...	...	0·19
Diseases of the Digestive system. Other diseases	285	...	...	8·09	92·2	...	...	2·62
Diseases due to disorders of nutrition or of metabolism	3	...	...	0·13	1·0	...	...	0·04
Diseases of the generative system	18	...	...	0·45	5·8	...	...	0·15
Diseases of Bones, Joints, Muscles, Fasciae and Bursae	51	...	2	3·34	16·5	...	0·65	1·08
Diseases of the areolar tissue	143	...	...	6·19	46·2	...	...	2.00
Diseases of the skin	69	...	...	2·20	22·3	...	...	0·71
Diseases of the urinary organs	5	...	...	0·22	1·6	...	...	0·07
Injuries. General	...	...	...	...	...	...	...	...
Injuries. Local	169	1	1	7·75	54·7	0·32	0·32	2·51
Injuries. In action	...	...	...	...	...	...	...	...
Tumours and cysts	13	...	...	0·52	4·2	...	...	0·17
Malformations	...	...	...	...	...	...	...	...
Poisons	1	...	...	0·01	0·3	...	...	0·00
Parasites	...	...	...	...	...	...	...	...
No appreciable disease	1	...	...	0·03	0·3	...	...	0·01
Other causes	...	...	...	...	...	...	...	...
Suicides*	1	1	...	0·01	0·3	0·32	...	0·00
Total	2,009	5	23	79·37	649·7	1·62	7·44	25·67

*The figures against "Suicides" having already been shown under the heading of the injury, etc., which caused death, are not included in the total.

TABLE XXII.

INDIAN OFFICERS AND INDIAN OTHER RANKS.

Table showing monthly ratios per 1,000 of strength of admissions for certain diseases for All-India during the year 1934.

	Strength.	Enteric group of fevers.	Influenza.	Cholera.	Small-pox.	Malaria.	Dysentery protozoal.	Dysentery bacillary.	Dysentery bacillary exudate.	Dysentery group.	Pyrexia of uncertain origin.	Pneumonia lobar and lobular.	Diarrhœa.	Dengue.	Sand-fly fever.	Plague.	Effects of heat.	All causes.
January	127,223	0·1	0·6	..	0·01	5·0	0·1	0·2	0·2	0·1	0·02	0·7	0·3	0·1	0·01	..	..	28·8
February	122,250	0·1	1·2	..	0·01	2·7	0·0	0·2	0·1	0·0		0·8	0·2	0·1		..	..	25·3
March	115,541	0·2	1·6	..	0·01	3·5	0·0	0·2	0·3	0·1	0·01	0·5	0·3	0·2	0·02	..	..	26·0
April	111,370	0·2	0·7	..	0·1	4·4	0·1	0·5	0·4	0·2	..	0·4	0·8	0·4	0·4	..	0·0	28·8
May	110,273	0·2	0·1	..	0·0	8·3	0·1	0·5	0·4	0·2	0·0	0·3	0·7	0·4	1·0	..	0·0	34·7
June	109,713	0·2	0·1	0·01	0·02	13·4	0·1	0·4	0·4	0·2	0·01	0·3	0·5	0·2	1·7	..	0·03	38·1
July	109,849	0·3	0·2	..	..	19·8	0·1	0·8	0·5	0·4	...	0·2	0·7	0·3	2·1	..	0·1	48·6
August	112,584	0·2	0·5	..	..	26·8	0·1	0·8	0·8	0·6	0·0	0·3	1·1	0·2	1·6	..	0·0	55·4
September	118.153	0·2	1·0	..	..	28·0	0·1	0·6	0·4	0·5	0·0	0·3	0·7	0·2	1·3	..	...	55·4
October	122,114	0·1	0·4	..	0·0	24·6	0·0	0·7	0·3	0·5	...	0·3	0·5	0·3	0·5	...	0·0	50·2
November	125,833	0·1	0·5	..	0·0	14·2	0·0	0·4	0·3	0·2	0·0	0·7	0·5	0·1	0·1	...	...	38·4
December	130,750	0·1	3·1	..	0·0	6·2	0·0	0·4	0·2	0·2	...	0·9	0·2	0·1	0·0	...	...	31·6
Total	117,888	1·9	10·5	0·0	0·2	155·6	0·7	5·5	4·3	3·3	0·1	6·0	6·3	2·4	3·3	..	0·2	461·2

TABLE

INDIAN OFFICERS AND

Table showing ratios per 1,000 of strength of admissions for certain

Station and Districts.	Average annual strength.	Enteric Group of fevers.					Dysentery.			
		Typhoid fever.	Para. A.	Para. B.	Para. C.	Enteric group.	Bacillary.	Bacillary exudate.	Protozoal.	Clinical.
Shagai	627	..	..	..	..	..	15·9	11·2	..	8·0
Chitral	135	..	..	..	..	7·4	..	14·8	..	..
Drosh	769	..	..	..	..	..	..	..	..	..
Landikotal	1,852	1·1	0·5	..	..	1·6	5·4	9·2	..	6·5
Malakand	796	2·5	1·3	..	..	..	..	..	1·3	2·5
Mardan	938	..	..	..	..	2·1	1·1	..	..	6·4
Nowshera	4,083	0·2	...	..	0·2	1·2	3·4	2·4	..	3·7
Peshawar	5,506	..	0·4	..	..	0·2	3·8	4·2	..	3·4
Peshawar Distt.	14,706	0·3	0·3	..	0·1	0·8	3·8	4·0	0·1	4·0
Fort Lockhart	325	..	..	..	..	..	6·2	..	..	..
Kohat	4,126	1·2	0·5	..	..	1·0	8·7	0·7	0·2	4·4
Thal	880	3·4	..	..	..	..	6·8	..	..	..
Kohat District	5,331	1·5	0·4	..	..	0·8	8·3	0·6	0·2	3·4
Abbottabad	3,884	0·5	0·5	..	..	1·8	0·8	4·1	..	3·6
Campbellpore	444	..	..	..	..	..	..	2·3	..	4·5
Jhelum	2,205	0·9	..	..	..	0·9	1·8	13·2	..	13·6
Kalabagh (Hazara)	124	..	..	..	..	..	..	..	..	..
Kuldana	244	4·1	..	..	..	..	16·4	4·1	..	4·1
Mona	43	..	..	..	..	..	..	..	..	..
Rawalpindi	4,272	1·2	..	..	..	..	5·1	10·5	0·7	3·7
Sargodha	44	..	..	..	..	..	..	..	..	22·7
Rawalpindi District	11,260	0·9	0.2	..	..	0·8	2·9	8·2.	0·3	5·7
Ambala	2,321	0·4	0·4	..	..	0·4	2·6	..	..	9·9
Amritsar	140	..	..	..	..	..	7·1	14·3	..	7·1
Bakloh	1,107	0·9	..	..	..	...	1·8	1·8	..	7·2
Dagshai	9	..	..	..	..	..	..	..	..	..
Dalhousie	16	..	..	..	..	..	..	..	..	..
Dharamsala	710	1·4	..	..	..	4·2	..	..	..	1·4
Ferozepore	2,010	..	0·5	..	..	1·0	2·5	3·0	..	2·5
Jullundur	2,027	..	0·5	..	..	1·5	3·0	3·0	..	4·4
Jutogh	182	..	..	..	..	..	..	5·5	..	16·5
Lahore	2,318	0·9	..	..	..	..	..	5·2	..	2·2
Multan	737	..	..	..	..	..	1·4	..	..	1·4
Sialkot	2,049	..	..	..	..	..	1·0	..	0·5	6·8
Solon	3	..	..	..	..	..	..	..	..	..
Subathu	9	..	..	..	..	..	..	..	..	..

XXIII

INDIAN OTHER RANKS.

Diseases in each Station and District in India during the year 1934.

Diarrhœa.	Cholera.	Venereal diseases.	Small-pox.	Malaria.	Dengue.	Sand-fly fever.	Plague.	Influenza.	Pneumonia lobar and lobular.	Heat-stroke.	Heat-exhaustion.	All causes.	Average number constantly sick.
14·4	..	12·8	..	285·5	..	3·2	..	..	4·8	..	1·6	575·8	13·44
..	..	..	..	111·1	..	..	..	..	..	..	..	318·5	12·15
9·1	..	1·3	..	79·3	..	16·9	..	1·3	1·3	..	..	197·7	6·64
4·3	..	9·2	..	171·7	..	120·9	..	74·0	3·8	..	..	575·6	14·96
5·0	..	2·5	..	383·2	..	1·3	..	..	11·3	..	..	562·8	13·23
8·5	..	8·5	1·1	367·8	..	1·1	..	..	5·3	..	..	335·8	22·93
5·1	..	3·7	..	192·0	..	4·4	..	39·7	6·4	..	2·0	478·6	12·89
9·6	..	12·0	0·2	279·3	..	23·8	..	2·4	8·9	..	0·2	540·1	21·19
7·5	..	8·0	0·1	241·1	..	26·5	..	21·3	6·8	..	0·7	529·2	16·61
3·1	..	3·1	..	307·7	..	..	..	..	..	..	3·1	529·2	12·83
1·7	..	6·3	..	142·8	..	8·7	..	..	7·0	..	0·2	366·7	15·47
6·8	..	10·2	..	244·3	..	13·6	..	3·4	2·3	..	..	492·0	14·78
2·6	..	6·8	..	169·6	..	9·0	..	0·6	5·8	..	0·4	397·3	15·20
12·6	..	8·2	0·3	169·7	..	9·8	..	1·5	5·7	..	0·3	433·1	14·09
6·8	..	..	..	74·3	..	18·0	..	..	..	..	2·3	223·0	4·80
11·3	..	4·5	..	238·1	..	2·7	..	47·6	10·9	..	0·5	702·0	20·08
..	..	..	..	80·6	..	..	..	8·1	..	..	..	322·6	9·52
12·3	..	8·2	..	61·5	..	..	..	..	12·3	..	..	307·4	19·34
23·3	..	..	..	883·7	..	..	..	46·5	23·3	..	..	1,418·6	23·49
6·6	..	7·0	..	194·3	..	19·7	..	6·3	10·1	..	..	488·3	17·47
45·5	..	..	..	181·8	..	22·7	..	22·7	22·7	..	..	1,000·0	16·59
9·9	..	6·6	0·1	188·1	..	12·2	..	12·6	8·3	..	0·3	500·4	16·28
3·4	..	6·5	..	101·7	..	6·0	..	6·9	8·6	..	..	373·5	14·05
..	..	21·4	..	142·9	..	28·6	..	..	14·3	..	..	521·4	21·43
0·9	..	8·1	..	151·8	..	3·6	..	..	7·2	..	..	334·2	11·19
..	..	..	..	..	..	..	..	..	..	..	..	..	..
..	..	..	..	..	..	..	..	..	..	..	..	62·5	115·00
1·4	..	9·9	..	181·7	..	..	..	..	..	..	..	332·4	9·56
5·5	..	9·9	0·5	112·4	..	11·9	..	..	12·4	..	..	428·9	14·08
1·0	..	6·4	..	117·9	..	4·4	..	7·4	4·4	..	..	339·9	12·66
..	..	11·0	..	16·5	..	..	..	22·0	5·5	..	..	208·8	12·53
19·8	..	11·2	..	99·7	..	38·4	..	58·2	11·2	..	2·6	513·4	18·21
4·1	..	9·5	..	109·9	..	..	..	2·7	4·1	..	..	462·7	17·20
11·2	..	5·9	..	95·7	..	..	..	..	6·3	..	..	424·1	17·28
..	..	..	..	..	..	..	..	..	..	..	..	..	..
..	..	..	..	..	..	111·1	..	..	..	..	..	111·1	3·33

TABLE—

Stations and Districts.	Average annual strength.	Enteric group of fevers.					Dysentery.			
		Typhoid fever.	Para. A.	Para. B.	Para. C.	Enteric group.	Bacillary.	Bacillary exudate.	Protozoal.	Clinical.
Lahore District	13,638	0·4	0·2	..	..	0·7	1·7	2·1	0·1	5·1
Bannu	2,157	1·4	1·4	0·5	..	..	7·9	0·5	0·9	0·5
D. I. Khan	121	..	..	..	..	..	..	..	..	..
Kalabagh and Mari Indus	134	..	..	..	..	..	..	..	..	..
Manzai	841	1·2	1·2	..	..	1·2	9·5	..	..	3·6
Razmak	4,759	1·1	0·4	0·4	0·2	..	6·9	0·8	0·8	2·7
Mir Ali	789	..	1·3	..	..	..	7·6	..	..	2·5
Wana	2,892	0·3	..	..	..	..	11·4	2·4	..	2·1
Waziristan District	11,693	0·9	0·6	0·3	0·1	0·1	8 3	1·0	0·5	2·1
Chaman	1,402	..	..	..	..	4·3	..	3·6	..	0·7
Quetta	6,773	0·6	1·5	0·1	..	1·0	17·6	11·7	1·0	7·5
Baluchistan District	8,175	0·5	1·2	0·1	..	1·6	14·6	10·8	0·9	6·4
Fort Sandeman	2,211	..	..	..	..	0·4	..	4·5	..	0·9
Hindubagh	262	..	..	..	..	..	3·8	3·8	..	3·8
Loralai	494	..	..	..	..	2·0	2·0	4·0	..	..
Zhob Bde. Area	2,967	..	..	..	..	0·7	0·7	4·4	..	1·0
Hyderabad	70	..	..	..	..	..	14·3	..	..	..
Karachi	1,596	0·6	0·6	..	..	0·6	14·4	..	..	1·8
Sind Bde. Area	1,666	0·6	0·6	..	..	0·6	14·4	..	..	1·2
Almora	234	..	..	..	..	..	4·3	..	..	..
Bareilly	1,346	1·5	0·7	..	..	0·7	2·2	3·7	..	..
Dehra Dun	2,040	..	0·5	..	..	1·0	2·9	8·3	1·0	0·5
Dehra Dun V.'s B. G.	103	..	..	..	..	..	..	9·7	9·7	..
Jhansi	1,314	0·8	0·8	..	..	3·0	7·6	5·3	3·0	6·8
Landsdowne	1,130	..	..	..	..	..	2·7	10·6	3·5	2·7
Meerut	2,460	1·2	0·4	..	..	2·4	9·3	4·9	3·3	..
Nowgong K. C.	84	..	..	..	..	..	11·9	..	..	..
Roorkee	1,901	..	..	..	..	..	1·1	1·1	..	1·6
Meerut District	10,612	0·6	0·4	..	..	1·2	4·6	5·3	1·8	1·5
Allahabad	665	1·5	..	..	..	..	7·5	..	..	..
Benares	648	..	..	..	..	..	..	..	1·5	..
Cawnpore	93	..	..	..	..	..	..	..	..	..
Fatehgarh	688	..	..	..	..	..	..	..	..	..
Fyzabad	445	2·2	..	..	..	..	..	..	2·2	4·5
Gorakhpore	139	..	..	..	..	..	..	..	..	..
Lucknow	1,797	0·6	..	..	..	0·6	12·8	1·7	1·7	15·6
Lucknow District	4,475	0·7	..	..	..	0·2	6·3	0·7	1·1	6·7
Alipore	823	..	1·2	..	..	3·6	9·7	6·1	7·3	..
Dacca	90	..	..	..	..	..	11·1	..	..	..
Dinapore	40	..	..	..	..	..	25·0	..	..	..
Bankura	538	..	..	..	..	..	..	3·7	1·9	1·9
Ghoom	59	..	..	..	..	..	..	..	..	..
Gyantse	89	..	..	..	..	..	..	..	..	..
Midnapore	520	..	..	..	..	..	1·9	..	..	..
Mymensingh	334	..	..	..	..	..	..	..	3·0	..
Comilla	581	3·4	..	..	..	..	..	..	..	1·7
Saidpur	578	..	1·7	..	..	..	..	..	..	..
Shillong	1,458	0·7	..	..	..	..	3·4	2·1	..	2·7

XXIII—*contd.*

Diarrhœa.	Cholera.	Venereal diseases.	Small-pox.	Malaria.	Dengue.	Sand-fly fever.	Plague.	Influenza.	Pneumonia lobar and lobular.	Heat-stroke.	Heat-exhaustion.	All causes.	Average number constantly sick.
7·0	..	8·4	0·1	112·1	..	10·6	..	12·6	7·8	..	0·4	406·0	14·90
4·6	..	9·3	..	171·5	..	35·7	..	12·5	8·8	..	..	600·8	19·48
..	..	8 3	..	264·5	..	...	..	..	...	..	..	479·3	14·55
..	..	171·6	7·5	216·4	..	14·9	..	..	22·4	..	..	1,268·7	40·37
14·3	..	8·3	..	107·0	..	28·5	..	..	4·8	..	..	418·5	13·26
6·1	..	7·1	..	139·9	..	0·6	..	5·3	6·7	..	..	569·2	19·58
7·6	..	5·1	..	238·3	..	12·7	..	34·2	12·7	..	..	482·9	10·60
1·0	..	4·1	..	492·4	..	0·7	..	3·1	7·3	..	..	840·2	23·87
5·1	..	8·6	0·1	239·4	..	10·1	..	7·5	7·6	..	..	632·0	19·73
5·0	..	9·3	..	107·7	..	1·4	..	3·6	1·4	..	..	307·4	12·41
1·9	..	5·3	0·1	144·7	..	0·6	..	..	5·2	..	..	372·7	15·42
2·4	..	6·0	0·1	138·3	..	0·7	..	0·6	4·5	..	..	361·5	14·90
10·4	..	3·6	..	465·4	..	16·3	..	15·4	5·4	..	..	686·6	16·54
3·8	..	3·8	..	209·9	..	7·6	..	..	..	..	..	305·3	5·27
12·1	..	4·0	..	400·8	..	2·0	..	..	..	..	..	657·9	15·89
10·1	..	3·7	..	432·1	..	13·1	..	11·5	4·0	..	..	648·1	15·44
..	..	28·6	..	285·7	..	42·9	..	..	14·3	..	..	500·0	15·57
..	..	5·0	..	141·0	..	3·1	..	..	0·6	..	..	355·3	12·12
..	..	6·0	..	147·1	..	4·8	..	..	1·2	..	..	361·3	12·26
12·8	..	42·7	..	235·0	..	..	..	..	21·4	..	..	632·5	26·92
5·2	..	7·4	..	60·2	..	..	..	..	5·9	..	..	503·0	17·79
6·4	..	11·8	0·5	129·4	..	..	..	..	4·9	..	..	410·8	18·48
..	...	..	...	58·3	9·7	..	..	48·5	...	..	...	310·7	7·48
18·3	..	9·9	..	143·1	0·8	1·5	..	15·2	2·3	..	..	556·3	16·63
15·0	..	11·5	..	168·1	..	..	..	26·5	7·1	..	..	699·1	30·20
8·5	..	13·0	1·6	85·4	..	4·9	..	..	6·9	..	..	456·5	19·97
..	..	..	11·9	71·4	..	..	..	..	..	..	..	238·1	6·31
5·8	..	4·7	..	101·5	..	..	..	..	4·2	..	..	275·1	11·39
9·0	..	10·5	0·6	112·4	0·2	1·3	..	5·2	5·6	..	..	460·0	18·47
10·5	..	16·5	..	70·7	..	..	..	..	4·5	..	..	394·0	19·35
7·7	..	4·6	..	38·6	..	..	..	...	7·7	..	..	375·0	15·65
..	..	..	..	53·8	..	..	..	..	..	..	..	215·1	9·68
2·9	..	4·4	...	90·1	..	4·4	..	10·2	13·1	..	..	385·2	11·48
6·7	..	6·7	..	56·2	..	..	..	155·1	4·5	..	..	442·7	12·27
..	..	..	7·2	338·1	..	..	..	..	...	..	..	446·0	10·94
20·0	..	11·7	...	84·0	..	0·6	..	1·1	5·6	..	..	505·8	20·04
11·8	..	9·2	0·2	80·9	..	0·9	..	17·4	6·5	..	..	437·5	16·72
1·2	1·2	19·4	..	115·4	14·6	..	..	7·3	3·6	..	..	464·2	34·85
..	..	44·4	..	55·5	11·1	..	..	77·8	11·1	..	..	488·9	12·44
..	..	...	..	25·0	..	..	..	..	..	..	25·0	250·0	7·50
3·7	..	7·4	..	55·8	..	..	..	18·6	11·2	..	..	364·3	15·72
..	..	16·9	..	...	..	..	..	...	16·9	..	..	322·0	16·10
..	..	11·2	..	56·2	..	..	..	..	11·2	..	..	146·1	4·27
11·5	..	34·6	...	125·0	..	..	..	1·9	3·8	..	..	490·4	12·85
12·0	..	9·0	..	146·7	..	..	..	...	9·0	..	..	565·9	17·16
1·7	..	17·2	..	129·1	..	..	..	86·1	..	..	..	254·7	5·78
3·5	..	31·1	..	129·8	..	..	..	46·7	6·9	..	..	418·7	7·47
7·5	..	15·1	..	88·5	..	...	..	0·7	5·5	..	..	373·8	17·00

TABLE—

Stations and Districts.	Average annual strength.	Enteric group of fevers.					Dysentery.			
		Typhoid fever.	Para. A.	Para. B.	Para. C.	Enteric group.	Bacillary.	Bacillary exudate.	Protozoal.	Clinical.
Chittagong. . . .	893	...	...	...	...	...	...	1·1	4·5	...
P. & A. District. . . .	6,003	0·5	0·3	..	..	0·5	2·7	1·8	2·0	1·0
Agra . . .	95	..	..	..	..	10·5	..	..	..	..
Delhi . . .	1,749	0·6	2·9	..	..	2·3	1·1	2·9	..	5·7
Muttra . . .	636	1·6	..	..	..	3·1	..	1·6	1·6	6·3
Delhi Bde. Area . . .	2,480	0·8	2·0	..	..	2·8	0·8	2·4	0·4	5·6
Ahmednagar . . .	943	1·1	..	..	..	1·1	..	2·1	..	..
Aurangabad . . .	995	..	..	..	..	..	3·0	8·0	..	2·0
Jubbulpore . . .	2,168	0·5	0·5	..	..	1·8	14·3	8·3	0·9	0·9
Kamptee . . .	554	1·8	1·8	..	..	1·8	..	1·8	..	..
Pachmarhi . . .	361	..	..	..	..	..	2·8	8·3	..	..
Saugor . . .	411	2·4	2·4	..	..	..	2·4	9·7	..	..
Trimulgherry . .	3,011	0·3	..	..	..	0·7	8·3	14·3	1·3	2·3
Deccan Distric . .	8,443	0·6	0·4	..	..	0·9	7·2	9·4	0·7	1·3
Belgaum . . .	1,064	0·9	..	..	..	..	1·9	4·7	..	..
Poona . . .	4,082	0·2	0·2	..	..	1·2	9·6	6·9	1·0	0·
Poona Bde. Area . . .	5,146	0·4	0·2	..	..	1·0	8·0	6·4	0·8	0·4
Ahmedabad . . .	549	3·6	..	..	..	1·8	..	3·6	3·6	9·1
Baroda . . .	520	..	..	..	..	1·9	..	1·9	..	1·9
Bombay . . .	682	..	..	..	..	..	..	..	..	..
Deolali . . .	120	..	..	..	..	..	..	..	..	8·3
Mhow . . .	686	..	..	..	..	1·5	16·0	11·7	1·5	1·5
Mt. Abu . . .	20	..	..	..	..	..	..	..	..	..
Nasirabad . . .	742	5·4	..	..	..	..	..	..	4·0	..
Neemuch . . .	575	..	..	..	..	3·5	..	..	1·7	10·4
Bombay District . . .	3,894	1·5	..	..	..	1·3	2·8	2·8	1·8	3·6
Bangalore . . .	2,418	0·8	0·4	..	..	0·4	6·2	1·7	..	0·4
Cannanore . . .	555	..	..	..	..	..	3·6	1·8	..	1·8
Madras, St. Thomas Mt. . . .	548	1·8	..	..	..	..	23·7	14·6	..	..
Trichinopoly . .	125	..	..	..	..	..	..	..	..	..
Wellington . . .	49	..	..	..	..	..	40·8	40·8	..	..
Madras District . . .	3,695	0·8	0·3	...	..	0·3	8·7	4·1	..	0·5
Mandalay . . .	811	2·5	..	..	..	..	3·7	2·5	..	1·2
Maymyo . . .	1,498	0·7	..	..	..	2·0	4·0	..	2·0	..
Mingaladon . . .	783	..	..	..	..	..	6·4	1·3	5·1	2·6
Burma District . . .	3,092	1·0	..	..	..	1·0	4·5	1·0	2·3	1·0
All-India . .	117,276	0·6	0·4	0·03	0·02	0·8	5·6	4·3	0·7	3·3

XXIII—*concld.*

Diarrhœa.	Cholera.	Venereal diseases.	Small-pox.	Malaria.	Dengue.	Sand-fly fever.	Plague.	Influenza.	Pneumonia, lobar and lobular.	Heat-stroke.	Heat-exhaustion.	All causes.	Average number constantly sick.
4·5	..	16·8	..	285 6	..	..	..	..	2·2	..	..	484·9	13·78
5·2	0·2	18·7	..	130·6	2·2	..	..	17·0	5·2	..	0·2	412·5	16·17
21·1	..	31·6	..	105·3	..	..	..	..	10·5	..	..	568·4	22·42
6·3	..	8·6	..	108·6	..	..	..	5·7	4·0	..	..	430·5	16·30
14·2	..	4·7	..	206·0	..	11·0	..	..	6·3	..	..	533·0	17·91
8·9	..	8·5	..	133·5	..	2·8	..	4·0	4·8	..	..	462·1	16·94
1·1	..	4·2	..	40·3	..	..	..	..	9·5	..	..	313·9	8·54
2·0	..	4·0	1·0	164·8	..	..	..	15·1	7·0	..	..	375·9	12·69
3·2	..	1·8	..	80·3	..	..	..	43·8	2·3	..	..	511·5	14·12
14·4	..	7·2	..	65·0	..	74·0	..	..	18·1	..	..	523·5	15·45
2·8	..	..	..	113·6	..	..	..	5·5	..	..	..	227·1	4·43
7·3	..	7·3	..	158·2	..	2·4	..	2·4	4·9	..	..	425·8	11·41
6·8	..	10·6	1·7	18·3	..	0·7	..	2·3	2·7	..	0·3	277·3	14·98
4·9	..	6·0	0·7	67·9	..	5·2	..	14·2	4·9	..	0·1	374·4	18·17
..	..	16·9	..	17·9	..	..	..	14·1	2·8	..	..	423·9	14·86
2·9	..	18·4	0·2	67·6	..	..	..	0·2	3·4	..	..	292·5	12·00
2·3	..	18·1	0·2	57·3	..	..	..	3·1	3·3	..	..	319·7	12·59
..	..	1·8	..	169·4	..	7·3	..	..	5·5	..	..	326·0	9·51
1·9	..	1·9	..	223·1	..	..	..	..	3·8	..	..	380·8	8·71
1·5	..	13·2	..	30·8	..	..	..	5·9	1·5	..	..	309·4	14·71
8·3	..	8·3	..	175·0	..	..	..	..	25·0	..	..	366·7	13·75
10·2	..	7·0	..	107·9	..	1·5	..	2·9	2·9	..	..	396·5	19·74
..	..	..	..	300·6	..	..	..	250·0	..	..	..	800·0	13·50
5·4	..	6·7	1·3	241·2	..	6·7	..	..	8·1	..	..	456·9	19·45
1·7	..	8·7	1·7	502·6	..	..	..	8·7	..	..	..	690·4	15·60
3·9	..	6·9	0·5	205·2	..	2·6	..	4·1	4·4	..	..	425·3	15·06
8·3	..	16·5	..	281·1	7·4	..	..	7·9	3·7	..	..	407·3	19·62
3·6	..	5·4	..	37·8	7·2	..	..	7·2	3·6	..	..	322·5	10·27
5·5	..	9·1	..	14·6	83·9	..	..	5·5	1·8	..	..	425·2	17·7
..	..	8·0	..	8·0	24·0	..	..	24·0	..	..	..	328·0	11·92
..	..	40 8	..	40·8	..	..	..	..	..	..	..	428·6	13·47
6·8	..	13·8	..	27·0	19·2	..	..	7·8	3·2	..	..	395·1	17·59
..	..	81·4	..	85·1	71·5	..	..	..	6·2	..	..	600·5	27·16
3·3	..	25·4	0·7	174·9	2·7	..	..	30·0	6·0	..	..	691·6	25·70
2·6	..	8·9	..	40·9	178·8	..	..	7·7	..	..	..	620·7	24·06
2·3	..	35·9	0·3	117·4	65·3	..	..	16·5	4·5	..	..	649·7	25·67
6·3	0·01	9·6	0·2	156·5	2·5	8·3	..	10·5	6 0	..	0·2	456 8	16·14

TABLE XXIV.

BRITISH OFFICERS OF THE INDIAN ARMY.

Table showing the average strength, admissions into hospital, deaths, numbers invalided and average constantly sick, during the year 1934, with ratios per 1,000 of the strength.

Diseases. Average strength, 2,097.	Admissions.	Deaths.	Invalids.	Average number constantly sick.	Ratio per 1,000. Admissions.	Deaths.	Invalids.	Constantly sick.
Specific Diseases due to infection or infestation.								
Cholera	...	...	...	...	...	...	...	...
Dengue	3	...	...	0·05	1·4	...	...	0·02
Diphtheria	2	...	...	0·10	1·0	...	...	0·05
Dysentery bacillary	17	...	...	0·49	8·1	...	...	0·23
,, ,, exudate	14	...	...	0·32	6·7	...	...	0·15
,, Protozoal	10	...	1	1·68	4·8	...	0·48	0·80
,, Clinical	7	...	...	0·17	3·3	...	...	0·08
Enteric fever (inclusive of typhoid, Para. A, B & C and enteric group).	2	...	...	0·30	1·0	...	...	0·14
Erysipelas	2	...	...	0·07	1·0	...	...	0·03
Influenza	25	...	...	0·40	11·9	...	...	0·19
Malaria	79	...	...	2·08	37·7	...	...	0·99
Measles	1	...	...	0·02	0·5	...	...	0·01
Meningococcal infection (cerebro-spinal fever)	...	...	...	...	...	...	...	...
Mumps	1	...	...	0·04	0·5	...	...	0·02
Plague	...	...	...	...	...	...	...	...
Pneumonia	6	1	...	0·76	2·9	0·48	...	0·36
Pyrexia of uncertain origin	1	...	...	0·06	0·5	...	...	0·03
Rheumatic fever	...	...	...	...	...	...	...	...
Sand-fly fever	26	...	...	0·40	12·4	...	...	0·19
Scarlet fever	2	...	...	0·12	1·0	...	...	0·06
Small pox	...	...	...	...	...	...	...	...
Scabies	...	...	...	...	...	...	...	...
Tuberculosis — Pulmonary	1	...	1	0·13	0·5	...	0·48	0·06
Tuberculosis — Other	...	...	...	...	...	...	...	...
Venereal diseases — Gonorrhœa	1	...	...	0·04	0·5	...	...	0·02
Venereal diseases — Soft chancre	...	...	...	...	...	...	...	...
Venereal diseases — Syphilis	...	...	...	...	...	...	...	...
Venereal diseases — Other V. D.	...	...	...	...	...	...	...	...

Typhus fever	...	...	...	...	...	...	...	...
Other diseases due to infection or infestation	23	2	...	0·97	11·0	0·95	...	0·46
Other diseases classified under systems.								
Diseases of the nervous system	14	1	...	0·45	6·7	0·48	...	0·21
Mental diseases	6	...	1	0·17	2·9	...	0·48	0·08
Diseases of the eye	8	...	...	0·18	3·8	...	...	0·09
Diseases of the ear and nose	34	...	...	0·82	16·2	...	...	0·39
Diseases of the circulatory system. — Valvular diseases of the heart	1	...	...	0·00	0·5	...	...	0·00
Diseases of the circulatory system. — Disordered action of the heart	...	...	...	...	...	...	...	...
Diseases of the circulatory system. — Other diseases	2	...	...	0·28	1·0	...	...	0·13
Diseases associated with abnormalities of the blood	1	...	...	0·01	0·5	...	...	0·00
Diseases of the spleen	...	...	...	...	...		...	...
Diseases of the lymphatic system	4	...	...	0·21	1·9	...	...	0·10
Diseases of ductless or endocrine glands	1	...	...	0·01	0·5	...	...	0·00
Diseases of the breast	...	...	...	...	...	...	...	...
Diseases of the respiratory system. — Larynx and trachea	1	...	...	0·01	0·5	...	...	0·00
Diseases of the respiratory system. — Bronchi & bronchioles	14	...	...	0·26	6·7	..	...	0·12
Diseases of the respiratory system. — Lung, other than tuberculosis and pneumonia.	...	...	...	...	...	...	...	...
Diseases of the respiratory system. — Other diseases	3	...	...	0·12	1·4	...	...	0·06
Diseases of the teeth and gums	3	...	...	0·02	1·4	...	...	0·01
Diseases of the digestive system. — Inflammation of the tonsils.	36	...	...	0·63	17·2	...	...	0·30
Diseases of the digestive system. — Liver diseases	18	...	...	0·85	8·6	...	...	0·41
Diseases of the digestive system. — Other diseases	121	1	1	3·53	57·7	0·48	0·48	1·68
Diseases due to disorders of nutrition or of metabolism	1	...	...	0·02	0·5	...	...	0·01
Diseases of the generative system	7	...	...	0·25	3·3	...	...	0·12
Diseases of Bones, Joints, Muscles, Fasciae and Bursae	29	...	...	1·10	13·8	...	...	0·52
Diseases of the areolar tissue	40	...	...	1·07	19·1	...	...	0·51
Diseases of the skin	11	...	...	0·38	5·2	...	...	0·18
Diseases of the urinary organs	19	1	...	0·91	9·1	0·48	...	0·43
Injuries — General	5	1	...	0·05	2·4	0·48	...	0·02
Injuries — Local	97	2	2	3·69	46·3	0·95	0·95	1·76
Injuries — In action	...	...	...	...	...	...	...	...
Tumours and cysts	1	...	...	0·04	0·5	...	...	0·02
Malformations	1	...	...	0·02	0·5	...	...	0·01
Poisons	...	...	...	...	...	...	...	...
Parasites	...	...	...	...	...	...	...	...
No appreciable disease	2	...	...	0·07	1·0	...	...	0·03
Other causes	...	...	...	...	...	...	...	...
Suicides*	...	(1)	...	..	...	(0·48)	...	...
Total	703	9	6	23·35	335·2	4·29	2·86	11·13

* The figures against "Suicides" having already been shown under the heading of the injury, etc., which caused death, are not included in the total.

TABLE XXV.

INDIAN OFFICERS AND INDIAN OTHER RANKS.

Table showing admission and death ratios per 1,000 of strength by Commands contrasted with the previous year, and the average for the previous 5 years.

Commands.	Years.	Enteric group of fevers.		Influenza.		Cholera.		Small-pox.		Malaria.		Dysentery.	
		A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.
Northern Command	1929-33	2·5	0·21	8·4	0·01	0·1	0·02	0·2	0·02	218 3	0·13	15·7	0·03
	1933	2·2	0·21	9·9	..	..	..	0·4	0·04	281·9	0·07	15·0	0·02
	1934	1·7	0·18	12·7	..	..	..	0·1	0·02	192·4	0·09	12·3	0·02
Western Command	1929-33	2·7	0·17	4·3	..	0·0	..	0·2	..	174·6	0·07	24·6	0·07
	1933	2·3	0·23	7·4	..	..	..	0·5	..	283·0	0·08	27·0	..
	1934	2·6	..	3·0	..	..	..	0·1	..	207·5	..	23·9	0·16
Eastern Command	1929-33	2·3	0·23	8 2	..	0·1	0·04	0·3	0·02	113·3	0·13	14·5	0·05
	1933	1·8	0·08	7·5	..	0·0	..	0·3	..	122·7	0·04	11·5	..
	1934	2·1	0·08	10·4	0·04	..	..	0·3	0·04	113·3	0·04	11·6	0·08
Southern Command	1929-33	1·9	0·14	8·6	..	0·0	0·02	0·2	0·02	85·5	0·04	16·9	0·06
	1933	1·9	0·28	9·8	..	..	..	0·2	0·05	101·7	0·05	14·3	0·05
	1934	1·9	0·14	8·5	..	..	..	0·4	..	83·4	..	15·5	0·05
Burma District	1929-33	2·8	0·10	22·1	..	0·0	..	0·1	..	167·0	0·25	11·9	..
	1933	0·7	..	82·6	..	..	..	..	..	98·6	..	9·6	..
	1934	1.9	..	16·5	..	..	..	0·3	..	117·4	..	8·7	..
All-India	1929-33	2·4	0·19	8·3	0·00	0·1	0·02	0·2	0·01	166·7	0·11	16·6	0·04
	1933	2·1	0·20	11·0	..	..	..	0·4	0·03	212·2	0 06	15·3	0·02
	1934	1·9	0·13	10·5	0·01	0·0	..	0·2	0·02	156·5	0·05	13·9	0·05

		Pyrexia of uncertain origin.		Pneumonia lobar and lobular.		Venereal diseases.		Dengue.		Sand-fly fever.		Plague.	
		A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.
Northern Command	1929-33	0·1	0·01	9·9	1·30	8·1	0·01	0·03	..	26·0	..	..	0·00
	1933	0·0	..	7·7	0·87	8·1	0·02	..	..	10·5	..	..	0·03
	1934	0·1	..	7·4	0·62	7·8	0·04	..	..	14·8	..	..	..
Western Command	1929-33	0·2	..	8·0	1·25	5·8	0·03	0·1	..	11·8	..	..	..
	1933	0·1	..	5·7	1·21	6·0	..	0·1	..	7·6	..	..	..
	1934	0·1	..	4·0	0·31	5·5	..	..	..	4·1	..	..	..
Eastern Command	1929-33	0·2	0·01	7·4	0·81	14·6	..	1·1	..	3·3	..	..	..
	1933	0·2	..	5·1	0·42	13·8	..	2·3	..	5·6	..	..	..
	1934	0·1	..	5·6	0·51	12·1	..	0·6	..	1·1	..	..	..
Southern Command	1929-33	0·6	0·02	5·2	0·62	14·8	..	3·4	..	1·7	..	0·1	0·09
	1933	0·2	0·05	3·5	0·61	12·8	..	3·9	..	3·2	..	0·3	0·23
	1934	0·2	0·05	4·1	0·28	10·5	0·05	3·4	..	2·5	..	..	..
Burma District	1929-33	0·0	..	6·7	0·94	41·1	0·10	23·9		0·5	..	0·1	..
	1933	0·3	..	8·7	0·33	44·3	..	35·0	..	..	..	..	..
	1934	..	..	4·5	0·32	35·9	..	65·3	..	..	..	..	..
All-India	1929-33	0·2	0·01	8·2	1·06	11·4	0·01	1·6	..	14·6	..	0·0	0·02
	1933	0·1	0·01	6·2	0·76	10·8	0·01	2·1	..	10·4	..	0·1	0·05
	1934	0·1	0·01	6·0	0·49	9·6	0·03	2·5	..	8·3	..	..	..

TABLE XXVI.

DETAIL OF DISEASES.

1934.

Diseases.	European Army of India. British officers attached to European troops. 2,344. A.	D.	Invalids.	Men. 54,429. A.	Constantly sick.	D.	Invalids.	Women. 4,480. A.	D.	Children. 6,932. A.	D.	Indian Army. British officers attached to Indian troops. 2,097. A.	D.	Invalids.	Men present. 117,276. A.	D.	Invalids.	Constantly sick.	Jail population of India. 147,654. A.	D.
Diseases caused by infection or infestation.																				
Anthrax	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	1	..	0·11	..	..
Blackwater fever	..	..	..	..	..	..	..	..	..	..	..	..	..	..	4	1	..	0·24	1	1
Chicken-pox	3	..	..	8	0·45	..	..	..	..	3	..	1	..	..	104	..	..	6·53	908	..
Cholera	..	..	..	4	0·18	..	..	..	..	..	..	..	..	..	1	..	..	0·05	35	7
Cow-pox (Vaccinia)	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	..	..	0·14	..	..
Dengue	8	..	..	360	9·33	..	..	12	..	10	..	3	..	..	288	..	..	7·36	265	..
Diphtheria	6	..	..	68	6·54	..	..	3	..	24	2	2	..	..	10	..	..	0·70	..	..
Dysentery																				
(*a*) Protozoal	23	..	..	163	12·98	..	5	7	..	8	..	10	..	1	80	1	..	5·93		
(*b*) Bacillary	48	..	..	896	38·55	..	5	43	..	134	8	31	..	..	1,161	4	..	42·21	4,895	119
(*c*) Clinical	9	..	1	330	13·90	..	..	11	..	19	1	7	..	..	391	1	..	13·01		
Encephalitis (lethargica)	..	..	..	..	..	..	1	..	..	..	..	..	..	..	1	..	..	0·08	..	..
Enteric Fevers—																				
(*a*) Typhoid fever	5	2	..	27	5·91	5	..	4	..	20	1	1	..	..	76	11	1	11·45		
(*b*) Paratyphoid A.	..	..	..	8	0·93	..	..	..	..	..	..	1	..	..	45	..	..	7·96		
(*c*) Paratyphoid B.	..	..	..	..	..	..	..	..	..	1	..	..	..	..	4	..	..	0·63	256	43
(*d*) Paratyphoid C.	1	..	..	1	0·11	..	..	..	..	..	..	..	..	..	2	..	..	0·21		
(*e*) Enteric Group	4	..	1	55	8·15	2	..	1	..	2	..	..	..	..	97	4	..	12·71		
Enteritis infective. (Including food poisoning)	1	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	2	..
Erysipelas	3	..	..	9	0·50	1	..	7	..	1	..	2	..	..	4	..	..	0·17	60	6
Gangrene, acute infective	..	..	..	..	..	..	..	..	..	1	..	..	..	..	3	..	1	0·97	13	2
Hydrophobia (Rabies)	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	2	..	0·06	1	1
Influenza	56	..	..	2	0·01	2	..	1	1	1	1	..	..	..	1,234	1	..	24·03	5,773	26
Jaundice epidemic catarrhal	42	..	..	847	21·20	..	1	17	..	38	..	25	..	..	202	1	..	10·23	..	..
Jaundice spirochætal	..	..	..	372	21·36	..	..	9	..	31	..	7	..	..	..	..	..	..	†29	†5
				..	..	..	..	..	..	..	..	..	..	..	..	..	..	..		

† Weil's disease.

Leishmaniasis—																						
(*a*) Kala-azar	..	..	..	3	0·66	..	1	..	..	1	..	..	..	..	24	1	3	4·26	280	17		
(*b*) Oriental sore	..	..	..	5	0·39	..	..	2	..	3	..	..	..	..	103	..	..	6·95	..	..		
Leprosy	..	..	1	..	0·20	..	1	..	..	..	..	..	..	..	9	..	6	1·52	150	9		
Malaria	77	..	..	3,676	120·26	2	2	112	..	140	2	79	..	..	18,353	6	7	407·75	23,119	91		
Measles	1	..	..	6	0·31	..	..	2	..	60	1	1	..	..	131	..	..	5·93	74	..		
Meningococcal infection (Cerebro-spinal fever)	..	..	..	2	0·17	1	..	..	..	..	..	..	..	..	39	15	..	3·58	130	78		
Mumps	2	..	..	18	0·85	..	..	..	..	4	..	1	..	..	953	..	..	47·41	1,751	1		
Plague	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	2		
Pyæmia	..	..	..	..	0·20	..	1	..	..	..	..	1	..	..	2	1	..	0·41	3	2		
Pyrexia of Uncertain Origin	5	..	..	46	3·01	..	..	..	..	1	..	1	..	..	14	1	..	1·13	1,182	2		
Relapsing fever	..	..	..	1	0·23	..	..	..	..	..	..	..	..	..	9	..	..	0·38	..	..		
Rheumatic fever	4	..	1	84	9·66	..	9	8	..	7	..	..	..	..	101	..	7	8·35	464	3		
Rubella (German measles)	3	..	..	16	0·50	..	..	..	..	5	..	1	..	..	..	..	..	..	..	..		
Sand-fly fever	57	..	..	1,973	38·93	..	..	17	..	32	..	26	..	..	970	..	..	17·29	406	1		
Scarlet fever	..	..	..	4	0·36	..	..	1	..	13	..	2	..	..	..	..	..	..	..	..		
Septicæmia	..	..	..	12	1·56	3	2	..	..	..	..	4	2	..	6	2	..	0·36	7	2		
Small-pox	1	..	..	6	0·29	..	..	2	..	1	..	..	..	..	23	2	..	1·83	54	1		
Tetanus	..	..	..	..	..	..	..	..	..	1	1	..	..	..	1	..	..	0·09	4	2		
Tuberculosis Pulmonary	2	..	2	56	17·49	1	51	6	..	3	2	1	..	1	212	8	192	20·95	854	320		
Tuberculosis Other cases	..	..	..	8	2·40	1	10	1	..	3	..	..	..	..	41	5	31	6·52	151	48		
Typhus fever	1	..	..	52	4·20	3	1	..	..	3	..	..	..	..	51	..	..	4·18	..	..		
Undulent fever	..	..	..	2	0·11	..	..	..	..	..	..	..	..	..	2	..	..	0·85	..	..		
Venereal diseases—																						
(*a*) Gonorrhœa	..	..	..	1,370	167·31	..	1	1	..	2	..	1	..	..	491	..	4	55·20	480	..		
(*b*) Soft chancre	..	..	..	221	23·63	..	..	..	..	..	..	..	..	..	229	..	..	21·96	98	..		
(*c*) Syphilis	..	..	..	244	21·96	..	3	1	..	..	..	..	..	..	409	*3	4	38·26	701	7		
(*d*) Other cases	..	..	..	22	1·67	..	1	..	..	..	..	..	..	..	1	..	..	0·03	1	..		
Whooping-cough	..	..	..	..	..	..	..	..	..	13	..	..	..	..	1	..	..	0·07	..	..		
Other diseases caused by infection	4	..	..	182	3·75	..	..	..	..	21	..	4	..	..	566	..	2	11·56	110	6		
Diseases due to infestation by Metazoan Parasites.																						
Ankylostomiasis	..	..	..	10	0·69	..	1	..	..	2	..	..	..	..	381	1	1	20·71	1,279	37		
Ascariasis	..	..	..	4	0 08	..	..	..	..	6	..	1	..	..	76	..	..	2·98	41	..		
Bilharziasis	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	5	..		
Dracontiasis (Guinea-worm)	1	..	..	21	2·88	..	1	2	..	..	..	..	..	..	225	..	7	17·53	245	..		
Intestinal tæniasis—																						
(*a*) Tænia Solium	1	..	..	40	1·01	..	..	9	..	15	..	2	..	..	34	..	..	1·02	4	..		
(*b*) Tænia Saginata	1	..	..	89	1·82	..	..	..	..	10	..	1	..	..	55	..	..	1·61	..	..		
Other Intestinal parasites	..	..	..	7	0·59	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..		
Pediculosis	..	..	..	10	0·15	..	..	..	..	..	..	..	..	..	2	..	..	0·07	6	..		
Scabies	..	..	..	76	3·04	..	..	1	..	..	..	..	..	..	1,317	..	..	40·43	697	..		
Other diseases due to infestation	..	..	..	7	0·21	..	..	3	..	6	..	1	..	..	96	..	..	5·77	97	2		

A.—Admissions. D.—Deaths. *Includes one death from hæmorrhage encephalitis.

TABLE XXVI—*contd.*

Diseases.	European Army of India.										Indian Army.						Jail population of India. 147,654	
	British officers attached to European troops. 2,344			Men. 54,429				Women. 4,480		Children. 6,932				Men present. 117,276				
	A.	D.	Invalids.	A.	Constantly sick.	D.	Invalids.	A.	D.	A.	D.	A.	D.	Invalids.	A.	D.	Invalids.	Constantly sick.	A.	D.
Diseases of the nervous system.																				
Aphasia	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	0·05	...	...
Cerebral hæmorrhage	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2	3	...	0·01	1	1
Chorea	...	...	...	...	...	...	...	...	...	3	...	...	...	...	...	...	...	...	...	...
Convulsions	...	...	...	2	0·04	...	...	...	...	4	2	...	...	...	...	...	...	...	...	...
Diseases of the spinal cord	...	...	...	7	1·00	1	7	...	...	...	...	...	...	...	4	1	2	0·32	...	...
Epilepsy	1	...	2	38	5·02	...	26	3	...	2	...	1	...	...	32	...	24	2·16	127	9
Meningitis	...	...	...	4	0·44	...	1	...	...	3	3	...	...	...	3	...	2	0·64	1	1
Neuralgia	...	...	...	25	0·59	...	...	1	...	...	...	1	...	...	38	...	...	1·05	172	1
Neuritis	5	...	...	27	2·36	...	2	5	...	...	...	...	...	...	53	...	4	4·02	58	1
Paralysis	...	...	...	8	0·51	...	...	1	...	1	...	...	...	...	35	1	4	3·45	30	1
Sciatica	1	...	...	15	1·73	...	1	2	...	...	...	...	...	...	120	...	4	5·70	39	...
Other diseases of the nervous system	3	1	...	276	8·23	1	10	9	...	3	1	12	...	...	120	3	1	4·45	176	17
Mental diseases.																				
Feeblemindedness	...	...	...	8	2·24	..	2	1	...	...	...	...	...	...	3	...	1	0·21	...	...
Hysteria	...	...	...	51	4·16	...	12	13	...	1	...	...	...	...	39	...	11	3·09	1	...
Involution (Melancholia)	...	...	...	4	1·21	...	4	...	...	...	...	...	...	...	3	...	2	0·42	15	1
Mania	...	...	...	4	0·48	...	2	1	...	...	...	...	...	...	3	...	3	0·32	27	...
Mental deficiency	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Neurasthenia	1	...	...	24	1·34	...	8	16	...	...	...	5	...	...	35	...	2	1·75	1	...
Schizophrenia (Dementia præcox)	...	...	...	20	5·96	...	20	...	...	...	...	...	...	...	9	...	9	0·96	13	...
Other mental diseases	2	...	2	41	6·87	...	19	7	...	...	...	1	...	1	28	1	12	2·46	17	2
Diseases of the eye.																				
Amblyopia and amaurosis	...	...	...	1	0·02	...	...	...	...	...	...	...	...	...	4	..	1	0·31	...	...
Anomalies of refraction	...	...	...	6	0·36	...	4	1	...	1	...	...	...	...	8	...	5	0·37	...	...
Blephritis	...	...	...	16	1·39	...	2	...	...	...	...	...	...	...	11	...	...	0·33	4	...
Conjunctivitis	3	...	...	98	3·40	...	1	1	...	14	...	3	...	...	766	...	1	24·37	745	...
Conjunctivitis granular (Trachoma)	...	...	...	2	0·20	...	1	...	...	...	...	...	...	...	180	...	7	10·08	46	...
Cataract	...	...	...	...	...	...	...	...	...	...	...	...	...	...	10	...	3	0·71	6	...
Glaucoma	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	11	...

Iritis	1	...	...	6	0·39	...	...	...	...	...	...	...	...	...	11	...	1	0·93	20	...
Keratitis	1	...	1	24	1·63	...	2	1	...	...	...	1	...	...	175	...	6	9·96	178	...
Retinitis	...	...	...	2	0·26	...	3	1	...	...	...	...	...	...	...	...	1	...	...	...
Other diseases of the eye	1	...	...	51	2·20	...	7	1	...	2	...	4	...	...	144	...	16	7·13	243	...
Diseases of the ear.																				
Inflammation of the external ear	3	...	...	241	6·84	...	...	1	...	7	...	2	...	...	112	...	1	3·13	89	1
Diseases of the middle ear	3	...	...	188	7·24	1	14	3	...	15	...	5	...	...	299	...	17	15·55	117	2
Diseases of the mastoid process	1	...	...	66	6·42	...	2	4	...	6	...	2	...	...	20	...	...	2·49	13	1
Other diseases of the ear	2	...	...	210	5·40	...	...	1	...	2	...	3	...	...	60	...	...	1·71	33	...
Diseases of the nose.																				
Diseases of the Mucous membrane	13	...	...	237	5·14	...	...	21	...	28	...	9	...	...	750	...	...	15·60	679	2
Diseases of the bone and cartilage	...	...	...	...	...	...	...	...	...	...	...		...	...	1	...	...	0·04	...	...
Other diseases of the nose	12	...	...	162	7·91	1	1	6	1	3	...	13	...	...	22	...	...	0·79	11	...
Diseases of the circulatory system.																				
Diseases of the Valves	...	...	...	17	1·31	...	13	4	...	...	...	1	...	...	17	...	17	1·35	100	30
Disordered Action of the Heart	2	...	1	172	12·67	5	19	8	...	5	1	...	...	...	45	6	11	2·38	4	1
Diseases of Blood vessels	9	...	2	73	4·72	1	7	15	...	...	...	1	...	...	38	1	3	1·74	4	2
Endocarditis	1	...	...	1	0·25	1	1	...	...	2	...	...	...	...	4	...	1	0·36	6	2
Myocarditis	...	...	1	2	0·03	...	2	2	...	1	...	1	...	...	2	1	...	0·08	45	18
Pericarditis	...	...	...	2	0·02	1	...	...	...	...	...	...	...	...	1	1	...	0·05	4	...
Other diseases of the Circulatory system	2	2	...	1	0·07	1	...	...	1	...	...	...	...	...	6	5	1	0·34	71	32
Diseases of the Blood and blood forming organs.																				
Anæmia primary	...	...	...	10	0·82	1	...	10	...	2	...	...	...	...	19	...	...	1·55	500	43
Anæmia pernicious	...	...	...	1	0·25	...	...	1	...	...	...	...	...	...	17	8	5	2·54		
Anæmia secondary	...	...	...	13	0·84	...	...	6	...	2	...	1	...	...	133	...	2	9·41		
Diseases of the spleen	...	...	...	1	0·07	1	...	...	...	1	...	...	...	...	31	...	1	1·39	61	1
Lymphadenitis	...	...	...	204	13·96	...	...	6	...	35	...	1	...	...	197	...	5	14·04	229	1
Lymphangitis	...	...	...	19	0·60	...	...	1	...	...	...	3	...		3	...	...	0·24	55	...
Other blood diseases	...	...	...	15	1·39	1	2	1	...	...	...	...	...	...	2	...	1	0·09	694	12

TABLE XXVI—*contd.*

Diseases.	European Army of India.										Indian Army.						Jail population of India. 147,654	
	British officers attached to European troops. 2,344			Men. 54,429			Women. 4,480		Children. 6,932		British officers attached to Indian troops. 2,097			Men present. 117,276				
	A.	D.	Invalids.	A.	Constantly sick.	D.	Invalids.	A.	D.	A.	D.	A.	D.	Invalids.	A.	D.	Invalids.	Constantly sick.	A.	D.
Diseases of Glands of internal Secretion.																				
Goitre	...	...	...	6	0·54	...	3	...	...	...	...	...	...	...	12	...	2	0·57	1	...
Hyperthyroidism	...	...	..	7	0·84	...	3	2	...	...	...	1	...	...	1	...	...	0 16	...	...
Other diseases	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	0·06	...	...
Diseases of the Breast.																				
Mastitis	...	...	...	21	0·74	...	...	14	...	...	...	...	...	...	1	...	...	0·03	4	...
Other diseases	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	1	...
Diseases of the Respiratory System.																				
Asthma	...	...	...	30	2·60	...	7	5	1	2	...	...	...	...	100	...	9	5·04	786	30
Bronchitis	13	...	1	775	28·24	1	6	48	...	184	...	14	...	...	1,680	...	4	56·19	3,347	18
Empyema	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	5	4
Laryngitis	1	...	...	46	1·16	...	...	1	...	7	...	1	...	...	111	...	2	3·63	12	1
Pleurisy	2	...	...	90	7·74	...	6	7	...	1	...	3	...	...	208	3	10	18·70	197	8
Pneumonia:—																				
(*a*) Lobar	8	...	1	176	16·55	9	4	2	...	12	1	6	1	...	586	47	...	45·53	1,637	398
(*b*) Lobular (Broncho-pneumonia)	1	...	...	36	3·13	2	...	3	1	50	11	...	...	...	118	11	1	9·00		
Other diseases	1	1	...	32	2·32	...	5	1	...	5	3	...	...	...	33	3	3	2·77	143	10
Diseases of the Teeth and Gums.																				
Caries of the enamel, dentine and cementum.	3	...	...	20	0·26	...	...	4	...	9	...	...	...	...	57	...	1	1·09	39	...
Gingivitis	1	...	...	21	0·49	...	...	...	...	4	...	...	...	...	132	...	...	3·06	65	...
Pyorrhoea alveolaris	4	...	...	58	1·35	...	...	5	...	4	...	2	...	...	40	...	2	1·46	52	1
Other diseases	4	...	...	19	0·39	...	...	4	...	2	...	1	...	...	58	...	...	2·01	306	2

Diseases of the Digestive System.																				
Appendicitis	27	1	1	475	33·52	4	3	47	...	18	1	16	1	...	182	6	2	11·53	77	4
Cholecystitis and cholangitis	5	...	...	23	1·69	...	...	6	1	1	...	3	...	...	23	...	1	1·76	14	1
Colic	7	...	...	192	5·04	...	...	7	...	...	...	3	...	...	138	...	...	3·26	571	...
Colitis	3	...	...	42	1·83	...	...	2	...	3	...	7	...	...	28	2	...	1·40	3,817	19
Constipation	4	...	...	346	7·03	...	1	31	...	70	...	1	...	...	373	...	...	5·98	277	...
Diarrhœa	42	...	...	811	19·01	...	...	43	...	145	...	22	...	...	742	...	...	17·13	2,866	25
Enteritis	4	...	1	44	1·14	1	...	3	...	50	11	1	...	...	22	...	...	0·44	172	21
Fistula in ano	...	...	...	10	0·86	...	...	...	...	...	...	...	...	...	46	...	...	3·03	26	...
Gastritis	16	...	...	342	11·54	...	...	31	...	20	1	11	...	...	119	1	...	4·39	95	2
Glossitis	...	...	...	2	0·21	...	...	...	...	...	...	...	...	...	11	...	...	0·54	2	...
Haemorrhoids (Piles)	12	...	...	225	9·41	...	...	2	...	...	...	11	...	...	205	...	...	10·91	597	3
Hepatitis acute	5	...	3	62	4·38	...	1	7	...	2	...	6	...	...	69	...	...	4·36	97	4
Hepatic abscess (Tropical abscess)	...	...	...	5	0·74	2	1	...	...	...	...	1	...	...	8	4	...	0·67	25	2
Hepatitis chronic (Cirrhosis)	...	...	...	...	0·22	...	1	...	...	1	...	...	...	...	3	1	1	0·27	55	5
Hernia	2	...	...	114	8·82	...	5	2	...	6	...	4	...	...	64	...	5	4·56	67	...
Hypertrophy of the tonsils	5	...	...	164	5·79	...	...	11	...	88	...	2	...	...	1	...	...	1·09	...	...
Indigestion	4	...	...	165	5·99	...	1	20	...	21	...	15	...	...	440	...	...	11·44	630	1
Intestinal obstruction	1	...	...	2	0·16	2	...	1	...	...	...	...	...	...	2	...	...	0·27	17	7
Inflammation of the palate and pillars of the fauces	...	...	...	4	0·11	...	...	...	...	2	...	...	...	...	1	...	...	0·02	...	...
Jaundice	3	...	...	25	1·84	...	...	2	...	3	...	11	...	...	111	2	...	6·34	235	4
Pharyngitis	14	...	...	441	10·01	...	...	10	...	23	...	8	...	...	2,529	...	...	46·70	87	1
Peritonitis	...	1	...	16	1·22	1	1	9	1	...	...	...	...	...	5	3	...	0·71	18	9
Sprue	2	...	...	5	0·88	...	4	2	...	1	...	...	...	...	13	...	...	1·71	16	3
Stomatitis	...	...	...	6	0·19	...	...	2	...	6	...	...	...	...	27	1	...	0·98	140	...
Tonsillitis	52	...	...	1,696	41·81	...	...	55	...	171	...	36	...	...	637	...	1	13·32	119	...
Other diseases	15	1	2	363	22·39	4	18	36	...	39	1	17	...	1	223	6	5	12·87	651	31
Diseases due to disorders of Nutrition or of Metabolism.																				
Beri-beri	...	...	...	...	...	...	...	...	...	...	...	...	...	...	3	...	...	0·13	31	1
Diabetes mellitus	...	...	...	7	1·31	...	5	2	...	...	...	...	...	...	11	...	5	1·22	26	3
Gout	...	...	...	2	0·15	...	...	...	...	...	...	1	...	...	2	...	...	0·29	11	...
Inanition	...	...	...	5	0·27	...	...	3	...	35	11	...	...	...	7	...	...	0·26	8	1
Rickets	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Scurvy	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	13	...
Other diseases	...	...	...	...	...	...	...	1	...	8	...	...	...	...	6	...	...	0·30	20	...
Diseases of the Male Organs of Generation.																				
Balanitis	1	...	...	107	3·71	...	...	...	...	...	...	...	...	...	6	...	...	0·15	3	...
Epididymitis	...	...	...	54	2·79	...	3	...	...	...	...	1	...	...	27	...	...	1·15	3	...
Hydrocele of tunica vaginalis	...	...	...	32	1·42	...	...	...	...	2	...	1	...	...	16	...	...	0·83	110	...
Hypertrophy of the prostate	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Orchitis	...	...	...	48	2·12	...	...	...	...	...	...	3	...	...	69	...	...	2·48	246	1
Paraphimosis	...	...	...	12	0·46	...	...	...	...	1	...	...	...	...	5	...	...	0·28	8	...

TABLE XXVI—*contd.*

Diseases.	European Army of India.										Indian Army.						Jail population of India. 147,654	
	British officers attached to European troops. 2,344			Men. 54,429				Women. 4,480		Children. 6,932		British officers attached to Indian troops. 2,097			Men present. 117,276					
	A.	D.	Invalids.	A.	Constantly sick.	D.	Invalids.	A.	D.	A.	D.	A.	D.	Invalids.	A.	D.	Invalids.	Constantly sick.	A.	D.
Diseases of the Male Organs of Generation—contd.																				
Phimosis	2	...	...	101	4·51	...	...	...	...	29	...	...	...	...	35	...	...	2·06	35	...
Prostatitis	1	...	...	2	0·15	...	...	...	...	...	...	1	...	...	5	...	...	0·50	...	...
Stricture of the urethra	...	...	...	4	0·22	...	...	...	...	...	...	...	...	...	5	...	...	0·34	13	...
Urethral fistula	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	7	1
Urethritis	...	...	...	196	10·34	...	...	...	...	...	...	1	...	...	92	...	...	3·01	23	...
Varicocele	...	...	...	49	2·42	...	...	...	...	1	...	...	...	...	8	...	...	0·48	...	...
Other diseases	...	...	...	11	0·29	...	...	...	...	1	...	...	...	...	13	...	...	1·14	188	4
Diseases of the Female Organs of Generation.																				
Abortion	...	...	...	...	...	...	...	102	...	...	...	...	...	...	...	...	...	...	4	...
Affection connected with pregnancy and Parturition and consequent on parturition	...	...	...	...	...	...	...	56	2	...	...	...	...	...	...	...	...	...	3	...
Diseases of the ovary	...	...	...	...	...	...	...	3	...	...	...	...	...	...	...	...	...	...	...	...
Diseases of the *fallopian* tube	...	...	...	...	...	...	...	10	...	...	...	...	...	...	...	...	...	...	...	...
Displacements and distortions of the uterus	...	...	...	...	...	...	...	34	...	...	...	...	...	...	...	...	...	...	3	...
Dysmenorrhœa	...	...	...	...	...	...	...	5	...	1	...	...	...	...	...	...	...	...	1	...
Endometritis	...	...	...	...	...	...	...	23	...	...	...	...	...	...	...	...	...	...	1	...
Haemorrhage connected with parturition	...	...	...	...	...	...	...	2	...	...	...	...	...	...	...	...	...	...	...	...
Inflammation of vagina	...	...	...	...	...	...	...	2	...	1	...	...	...	...	...	...	...	...	...	...
Menorrhaegia	...	...	...	...	...	...	...	27	...	...	...	...	...	...	...	...	...	...	2	...
Metrorrhaegia	...	...	...	...	...	...	...	11	...	...	...	...	...	...	...	...	...	...	...	...
Pelvic peritonitis	...	...	...	...	...	...	...	2	...	...	...	...	...	...	...	...	...	...	...	...
Other diseases peculiar to women	...	...	...	...	...	...	...	53	...	2	1	...	...	...	...	...	...	...	56	2

Diseases affecting Child—																								
Asphyxia of child												1	2											
Injury to child																								
Premature birth												9	9											
Still-birth																								
Diseases of Bones, Joints, Muscles, Fasciæ and Bursæ.																								
Arthritis			2		2	28	3·38	1	8	4				1			46	1	6	8·81	56			
Diseases of the spine						4	0·55		8			1					10		4	1·04	8			
Flat foot						11	0·35		8								7		3	0·31				
Hammertoe						29	2·43		2	2							1			0·08				
Myalgia			4			210	5·52			12		3		9			260			6·15	295			
Osteo-myelitis						11	2·50		6			2					18		5	3·19	9			
Periostitis			1			16	1·30		1			1					32		1	1·53	22			
Synovitis			11			528	20·78		2			2		5			372		6	16·61	210			
Other deformities of limbs						14	1·36		9								5		3	0·35				
Other diseases			16		1	479	31·89		19	5		2		14			322		18	15·60	238	1		
Diseases of the areolar tissue.																								
Boil			14			452	13·02			3		7		6			666			20·16	898			
Carbuncle			2			30	0·94										22			1·00	41	1		
Cellulitis			79			2,136	72·84	1		16		52		30			2,680		1	97·06	904	9		
Cellulitis suppurative (abscess).			3		2	199	8·20	1		13		11	2	3			383		1	14·96	2,755	1		
Other diseases						18	0·61			2		5		1			13			0·76	70	1		
Diseases of the Skin.																								
Acne						10	0·73		1								14			0·62				
Dermatitis			5			195	10·58		4			3		4			357		1	15·34	25			
Eczema			5		2	92	6·86		3	3		1					271		2	13·57	416			
Favus						1	0·01																	
Herpes Zoster			2			37	1·58							1			79			2·41	23			
Impetigo			3			373	18·55		1			18		1			92			3·64	9			
Ingrowing toe nail						142	5·24			4		3		1			4			0·13				
Onychia						9	0·21										3			0·06	1			
Prickly heat						23	0·34										16			0·28	5			
Psoriasis						23	1·32										15		1	1·29	7			
Sycosis (Folliculitis)						21	2·57		2								14			0·80				
Tinea			2			312	11·34					1					264			9·17				
Urticaria						41	1·36			1		4		2			91			2·29	27			
Wart						45	2·54										8			0·44				
Whitlow			1			74	2·20							1			100			4·11	211			
Other diseases			2			112	5·01		6	1		5		1			71		1	3·01	1,792	4		

TABLE XXVI—*concld.*

Diseases.	European Army of India.										Indian Army.						Jail population of India. 147,654	
	British Officers attached to European troops. 2,344			Men. 54,429			Women. 4,480		Children. 6,932		British Officers attached to Indian troops. 2,097			Men present. 117,276				
	A.	D.	Invalids.	A.	Constantly sick.	D. Invalids.	A.	D.	A.	D.	A.	D.	Invalids.	A.	D.	Invalids.	Constantly sick.	A. D.
Diseases of the Urinary Organs.																		
Calculus—																		
(*a*) Bladder	...	...	...	1	0·03	... ...	...	...	...	...	1	...	...	14	1	...	1·09	... ...
(*b*) Kidney	...	...	...	5	0·62	... 1	3	...	...	...	...	...	...	13	...	...	0·81	6 1
(*c*) Ureter	2	...	...	4	0·64	... ...	...	...	...	...	...	...	...	1	...	1	0·23	... ...
Cystitis	5	...	...	50	3·95	... ...	16	...	10	...	5	...	...	23	...	...	1·03	35 3
Haematuria	3	...	...	53	3·60	... 1	1	...	1	...	...	...	...	4	...	...	0·17	9 ...
Incontinence of urine	...	...	...	20	1·06	... 1	...	...	1	...	...	...	...	3	...	...	0·26	... ...
Nephritis acute	1	...	...	12	2·20	... ...	2	...	2	...	3	1	...	15	5	2	1·53	106 22
Nephritis chronic	1	...	...	15	1·96	6 7	...	...	...	...	...	...	...	...	...	...	...	99 23
Other diseases	12	...	1	175	11·71	... 6	23	...	12	...	10	...	...	184	1	1	6·24	170 11
General Injuries.																		
Burns and scalds	...	...	...	...	...	... ...	...	...	...	...	...	...	...	...	...	...	...	93 3
Effects of anti-rabic treatment.	...	...	...	...	...	... ...	...	...	...	...	...	...	...	1	...	...	0·06	... ...
Effects of inoculation.	...	...	...	24	0·33	... ...	...	...	...	...	1	...	...	16	...	...	0·30	... ...
Heat exhaustion	3	...	..	77	2·49	4 1	...	...	...	...	2	...	...	23	...	...	0·44	6 ...
Heat stroke	...	...	...	11	0·69	5 ...	1	1	...	...	...	...	...	...	...	...	...	204 14
Sun stroke	1	...	...	2	0 03	... ...	...	...	...	...	...	...	...	...	...	...	...	57 7
Other injuries	1	...	...	24	0·70	8 1	...	...	...	...	2	1	...	4	6	...	0·15	105 9
Local Injuries.																		
Abrasions	10	...	...	164	4·43	... ...	...	...	1	...	6	...	...	187	...	...	6·29	165 ...
Burns and scalds	1	...	...	64	3·04	... ...	3	...	14	...	1	...	...	212	6	1	9·29	134 1
Concussions	17	...	1	90	4·23	1 1	1	...	2	...	8	...	2	23	2	...	1·72	3 1

Concussions	21	...	...	826	24·58	3	...	8	...	3	...	9	...	...	1,829	2	14	60·54	418	2
Dislocations and displacements.	2	...	...	101	5·76	...	3	...	...	...	...	10	...	...	82	...	7	5·08	36	...
Fractures	33	2	2	658	47·50	6	20	10	...	31	...	26	1	...	1,104	14	59	96·52	254	8
Sprains and strains	15	...	...	1,039	32·14	...	...	4	...	2	...	20	...	...	704	...	1	21·83	150	...
Wounds gun-shot	1	...	...	31	2·56	3	3	...	...	...	...	1	...	...	23	7	4	2·02	25	1
Wounds others	10	...	2	322	11·44	...	3	4	...	16	...	14	...	...	1,619	3	6	59·00	1,764	4
Injuries self inflicted	...	5	...	10	1·10	12	...	...	...	...	...	...	1	...	3	7	...	0·01	1	1
Other injuries	9	...	...	86	3·93	1	5	1	...	4	...	2	...	...	46	3	2	2·55	432	12
Tumours and Cysts.																				
Carcinoma	...	...	...	3	0·22	1	1	9	...	...	...	...	...	...	2	1	1	0·13	20	8
Cysts	1	...	...	49	1·99	1	...	2	...	1	...	...	...	...	109	...	...	3·66	65	2
Sarcoma	1	...	...	2	0·26	1	2	...	...	...	...	...	...	...	3	...	3	0·60	13	2
New growths malignant (other cases).	...	...	...	29	1·77	...	4	4	...	...	...	...	...	...	8	2	2	1·13	18	4
New growths non-malignant	1	...	...	26	2·22	...	5	2	...	...	...	1	...	...	46	1	3	2·60	6	1
Malformations	...	...	...	5	0·54	...	...	1	...	4	2	1	...	...	5	...	...	0·26	5	...
Poisons																				
Alcohol	...	...	...	1	0·05	...	...	...	...	...	...	...	...	...	1	...	...	0·01	...	...
Arsenic	...	...	...	1	0·07	1	...	...	...	...	...	...	...	...	1	...	...	0·01	...	...
Chloroform	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Other chemical poisons	...	...	...	1	0·03	...	...	...	...	1	...	...	...	...	5	1	...	0·10	...	...
Opium	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	0·01	2	1
Venom of insecta	...	...	...	...	...	...	...	...	...	...	...	...	...	...	4	...	...	0·08	2	...
Venom of Ophidia (Snake bite).	...	...	...	...	...	...	...	...	...	1	...	...	...	...	5	...	1	0·14	11	...
Other poisons	...	...	...	2	0·02	1	...	...	...	...	...	...	...	...	1	...	...	0·01	14	1
No appreciable diseases	2	...	...	168	5·31	...	...	36	...	16	...	2	...	...	39	...	...	1·46	21	...
All other causes	...	...	...	3	0·83	...	1	...	...	4	...	...	...	...	11	...	...	0·87	294	4
	1,006	16	37	31,246	1,411·13	121	511	1,398	10	2,077	82	703	9	6	54,335	250	669	1,919·39	80,075	1,808

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